OUR BIGGEST ISSUE EVER! 546 PAGES

Incorporating PC Sources

November 1993

PC Computing

SPECIAL ISSUE!

Rev up Windows with our huge, hands-on illustrated guide.

- Tips you can't get anywhere else
- Secrets they don't want you to know

Windows Superguide

It'll BE in your face

Pardon us, but would you mind if we sat right here on your desk, a mere two feet away from you, for the next few thousand hours?

Easy to live with. Easier to afford.

The new NEC MultiSync FG "e" monitors.

We realize that's a lot to ask. And we kept that firmly in mind when we created our new MultiSync® FGe™ monitors.

More monitor for less money.

For less than you'd expect, they give

you everything you ever wanted in a monitor.

Big, roomy screens—15" for our 3FGe and 4FGe, 17" for our 5FGe*—provide plenty of space for Windows and multimedia video. Higher refresh rates deliver even crisper, steadier images. They also offer broader compatibility with PC and Mac® platforms, including IBM®'s XGA®-2 standard. Compliance with strict Swedish MPR II emissions guidelines. Even, a new 3-year limited warranty.

All for a price that's nothing short of phenomenal for monitors this great.

The image you deserve.

Above all, they give you image quality so sharp, colorful and bright, it'll give your work a whole new focus.

For more on the amazing MultiSync FGe monitors, call 1-800-NEC-INFO. In Canada, 1-800-343-4418. For details via fax call NEC FastFacts®, 1-800-366-0476, and request document 1521.

Thank you for inviting us onto your desktop

Because ⬆ is the way you want to go.

NEC

Circle 121 on reader service card.

But it'll be okay.

In our new FGe series, the "e" is for ergonomics And economics. They're easy to use, easy to live with— the way NEC monitors have always been They're also easier to afford.

All day Every DAY

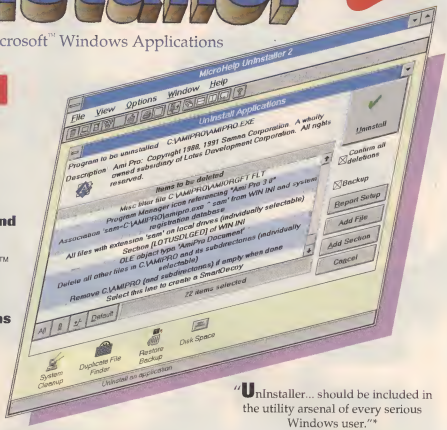
Do you have dirty Windows™?

If so, the answer is MicroHelp's...

MICROSOFT-WINDOWS-COMPATIBLE

UnInstaller™ 2

for Microsoft™ Windows Applications



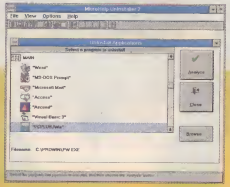
New Features

- **Removes fonts and video drivers**
- **Removes file manager extensions**
- **MDI interface featuring a status bar, a button bar and optional 3-D effects**
- **Supports Norton Desktop™ for Windows and most popular shells**
- **Removes DOS applications**
- **Removes duplicate and orphaned files**
- **Undo option**
- **Built-in file viewer**

FREE GROUND SHIPPING **$55**

"UnInstaller... should be included in the utility arsenal of every serious Windows user."*

Uninstalls any unwanted application— new or existing, completely and easily.



UnInstaller is simple to use, removing not only specified applications, but the user's headaches as well.

This utility from MicroHelp can help you keep your Windows clean by removing an application and all references to it. It does this by looking for application fingerprints — places where the application has touched your system.

"MicroHelp has done an excellent job of designing a useful utility. The UnInstaller's operation is well thought out, successfully anticipating the things you want to do when you remove an application."**

UnInstaller can even help network administrators remove applications from a network[1] server and all of the workstations on the network! When the administrator uninstalls a program, UnInstaller can leave a decoy copy of itself on the server, in place of the original program. When other users try to run the application from the network, UnInstaller offers to clean up their systems as well. This technology alone can save a network administrator many hours of work.

Note 1 Requires Uninstaller for Networks

* Reprinted from "WINDOWS SOURCES MAGAZINE," May 1993, Copyright © 1993 Ziff Communications Company

** Reprinted from "WINDOWS MAGAZINE," April 1993 Copyright © 1993 CMP, Inc

UnInstaller is a trademark of MicroHelp, Inc

Microsoft is a trademark and Windows is a registered trademark of Microsoft Corp Norton Desktop is a trademark of Symantec, Corp

DUSTIN DISCOUNT SOFTWARE

Plain Wrap Prices, Black Tie Service.

20969 Ventura Blvd., Ste 13, Woodland Hills, CA 91364 818-710-9174

Call Toll Free in the U.S.A. (Mon. thru Fri. 6 am to 6 pm, Sat. 10 am to 2 pm PST)

800-289-3878

Or Fax Your Order

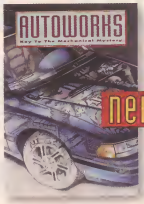
818-884-5310

Prices subject to change without notice

Circle 129 on reader service card.

Something For Everyone . . .

Introducing New, Innovative Computer Programs From Software Marketing Corporation



new

AutoWorks™

Key to the Mechanical Mystery™

Carburetors to compressors, gaskets to gears, AutoWorks covers it all . . . bumper to bumper. Just start up your computer and take a drive through AutoWorks, your Key to the Mechanical Mystery.

DOS $47

PharmAssist™

The Family Guide to Medicine and Health™

There are thousands of prescription and non-prescription drugs on the market today. PharmAssist provides quick, useful, easy-to-understand information about different medications.

Windows $47

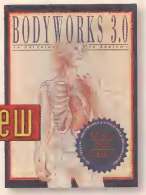
new

BodyWorks Version 3.0

An Adventure In Anatomy™

The human body is the ultimate machine. Colorful, comprehensive graphics guide you on a journey through the body. With its vast database, BodyWorks 3.0 lets you study specific areas from head to toe, zooming in and out for a complete detailed look at the world within you.

DOS & Widows $47



new

Holy Bible

King James Version

Use the power of the computer to learn more about the world's most popular book. Reacquaint yourself with the prophets and kings, gospels, psalms, and proverbs. Experience as never before the wonders and the wisdom of the Holy Bible.

DOS $35

new

SportsWorks™

The Competitor's Edge™

From Sumo to Shinty, Baseball to Bandy, SportsWorks is the ultimate sports-source for all ages. Whatever sport you play, watch or want to know more about, SportsWorks will coach you with the answers to questions for over 150 different sports.

DOS $35

new

UFO™

This Planet's Most Complete Guide to Close Encounters™

This unique software program provides evidence of extraterrestrial phenomenon with an expansive database containing a complete catalogue of 500 documented sightings. Available in CD-ROM or disk formats.

Disk $35; CD-ROM $39

new

FREE GROUND SHIPPING

ZodiacSigns
DOS $35

Orbits
DOS $35

DUSTIN DISCOUNT SOFTWARE

Plain Wrap Prices, Black Tie Service.

To Order

CALL TOLL-FREE

800-933-7754

OR FAX 818-884-5310

M-F 8 AM-6 PM, Sat 10 AM-2 PM PST

ChemistryWorks
$35 Includes DOS & Windows

ComputerWorks
Disk35; CD-ROM$47,
Both available on DOS platform

Published by: Software Marketing Corp.

Pricing and availability subject to change without notice.
All items are new. P.O.'s accepted from qualified buyers — net 30.
Shipping is non-refundable. Opened software is not returnable. All trademarks are property of their respective owners.

20563 Ventura Blvd., Ste. 13, Woodland Hills, CA 91364. (818) 710-5174

Circle 117 on reader service card.

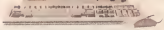
WHY BUY JU
COMPUTER WHEN
COMPAQ AT PRIC

All our PCs are backed by the COMPAQ free 3-year warranty†—the first such warranty in the industry. We can offer this kind of long-term guarantee because of our quality and testing standards. Prices include COMPAQ Monitors. Call for details on other COMPAQ desktops and notebooks, as well as printers.

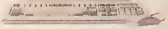
COMPAQ ProLinea 3/25s
25-MHz 386SX, 2-MB RAM, 120-MB hard drive, VGA Color Monitor. An affordable entry-level desktop PC.

†Restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. *Leasing is provided by GE Capital Corporation for a term of 36
All rights reserved. Printed in the USA. Compaq, the COMPAQ logo and DESKPRO Registered U.S. Patent and Trademark Office. Contura and ProLinea are trademarks of Compaq
without notice. All products are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks, and Windows is a trademark

ST ANOTHER YOU CAN GET A ES LIKE THESE?



COMPAQ ProLinea 4/25s
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Great for everyday business applications.



COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Designed for more advanced applications.

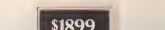
COMPAQ ProLinea 4/66
66-MHz 486DX2, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For high performance at an affordable price.

ProLinea Features

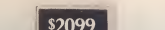
3½" 1.44-MB diskette drive ◆ 1024 x 768 local bus video graphics with 1-MB VRAM in up to 256 colors (on 486 models) ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0 and Microsoft Windows 3.1 and a COMPAQ Mouse.

DESKPRO/i Features

*3½" 1.44-MB diskette drive ◆ Integrated QVision Graphics displays up to 256 colors at 1024 x 768 with 512-KB VRAM option** ◆ 3 expansion slots ◆ 3 internal storage device positions ◆ Security features ◆ Business Audio ◆ COMPAQ Color Monitor, preinstalled MS-DOS 6.0, Microsoft Windows 3.1 & Sound System Software, COMPAQ Mouse & Microphone.*



COMPAQ DESKPRO 4/25is
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. Delivers fast, high-resolution graphics in Windows.

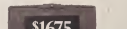


COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor. For even faster performance in a Windows environment.

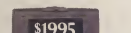
intel inside

Contura Features

3½" 1.44-MB diskette drive ◆ Power conservation and security features ◆ Battery Pack ◆ AC Adapter ◆ Preinstalled MS-DOS 6.0, Microsoft Windows 3.1 and EZ Help On-Line Library and a COMPAQ Trackball.



COMPAQ Contura 3/25
25-MHz 386SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. An affordable notebook loaded with features.



COMPAQ Contura 4/25
25-MHz 486SL, 4-MB RAM, 120-MB hard drive, monochrome VGA display, 6.2 lbs. Upgradeable to Active Matrix Color Display.

COMPAQ DirectPlus
1-800-888-6046

months, and is subject to approved credit and certain terms and conditions. Call for details. **Requires a 1024 Color Monitor. ©1993 Compaq Computer Corporation. Computer Corporation. COMPAQ DirectPlus and CompaqCare are service marks of Compaq Computer Corporation. Products, prices and programs are subject to change of Microsoft Corporation. The Intel Inside Logo is a trademark of Intel Corporation

Circle 231 on reader service card.

TIME IS
AND CALLING CO
CAN SAVE

We've put together these bundles to make it easy to get the hardware and software that you need in a complete system, at one special price. No matter what your computing needs, chances are that one of these bundles will fit the bill. Not only that, but the price you'll pay will fit well within your budget.

The Basics Plus.

COMPAQ ProLinea 4/25s
25-MHz 486SX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor.

Data+Fax Modem

WinFax PRO for Windows

Microsoft Works for Windows

Calendar Creator Plus Windows

AfterDark for Windows

Quicken for Windows

This entry-level system gives you a full range of business and personal applications as well as data and fax communications—all at a surprisingly low price.

$1,599
*Or $57 per month**
Save over $228[1]

*Leasing is provided by GE Capital Corporation for a term of 36 months, and is subject to approved credit and certain terms and conditions. Call for details. ©1993 Compaq Computer Corporation. COMPAQ DirectPlus is a service mark of Compaq Computer Corporation. Products, prices and programs are subject to change without notice. All Corporation. The Intel Inside Logo is a trademark of Intel Corporation. [1]Savings based on individual prices.

MONEY.
MPAQ DIRECTPLUS
YOU BOTH.

The Front Office.

COMPAQ ProLinea 4/33
33-MHz 486DX, 4-MB RAM, 120-MB hard drive, SVGA Color Monitor.

Quattro Pro for Windows

WordPerfect for Windows

This general business solution, which is offered to you at a very competitive price, teams up two popular word processing and spreadsheet applications.

$1,899
*Or $68 per month**
Save over $274†

The Windows Office.

COMPAQ DESKPRO 4/33i
33-MHz 486DX, 4-MB RAM, 240-MB hard drive, 1024 Color Monitor.

Extra 2-MB of RAM

The Microsoft Office for Windows

This solution can utilize COMPAQ business audio with the most popular Microsoft applications. The Microsoft Office includes Microsoft Excel, Word, PowerPoint and Mail.

$2,699
*Or $97 per month**
Save over $239†

The Office Pro.

COMPAQ ProLinea 4/50
50-MHz 486DX2, 4-MB RAM, 240-MB hard drive, SVGA Color Monitor.

Extra 4-MB of RAM

14.4-Kbps Data+Fax Modem

Winfax PRO for Windows

Lotus SmartSuite for Windows

This solution offers data and fax communications with popular Lotus applications. Lotus SmartSuite includes Lotus 1-2-3, AmiPro, Freelance Graphics, Organizer and cc:Mail.

$2,899
*Or $104 per month**
Save over $279†

intel inside

COMPAQ
DirectPlus
1-800-888-6046

Corporation. All rights reserved. Printed in the USA. Compaq, the COMPAQ logo and DESKPRO Registered U.S. Patent and Trademark Office. ProLinea is a trademark of products are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks, and Windows is a trademark of Microsoft

Circle 232 on reader service card.

PC Computing

Cover Story

177 Windows Superguide
Show Windows who's boss! Check out our Windows Superguide—a follow-up to last November's blockbuster, best-selling Superguide. It's our 48-page, maxed-out collection of essential Windows information.

184 Take Control of Windows
Windows throwing tantrums? Don't despair. Part One of the Superguide offers answers to the most vexing Windows problems in 12 key areas: startup, setup, memory, printing, fonts, integration, video, communications, networking, multimedia, DOS apps, and Win-OS/2.

280 When All Else Fails
Warning: Windows may be hazardous to your health. Part Two of the Superguide provides troubleshooting tips for banishing general protection faults, deciphering error messages, uninstalling Windows applications, and much more.

293 Undocumented Tricks
Brian Livingston's top ten Windows secrets.

298 486 Subnotebooks
Marty Jerome
One spin through O'Hare or Stapleton towing a notebook computer, and your arms feel like spaghetti noodles. Is the new crop of 486 subnotebooks poised to come to the rescue? You bet—as long as you're willing to compromise. We put the best of the best through performance, battery-life, and usability tests.

316 Word 6.0
Scot Finnie and Ed Bott
Still using your word processor as a glorified typewriter? Get the lead out—the new version of Word for Windows will change your notion of what word processing is. It's chock-full of usability improvements, and it can automatically overhaul the look and feel of your plain-Jane documents. Here's the scoop.

332 Windows Spreadsheets
Robin J. Walden
Spreadsheets were the killer apps that ushered in the PC. For this comparison, we put the top three Windows spreadsheets, along with Lotus Improv and Computer Associates' CA-Compete, through our Usability Labs. You got numbers to crunch? We got answers.

PAGE 298 LIGHTER-THAN-AIR SUBNOTEBOOKS

New!

52 **Showdown at the OS Corral**
OS/2 and Windows NT: Which is fastest and slickest?

58 **Pentium Meets Multimedia**
Three powerhouse PCs that take multimedia from tolerable to terrific.

62 **Cheap Green Printers**

64 **One-Stop Shopping for E-Mail**

67 **Two Hot New Quickens**

72 **Slick Video Software**

74 **Conferencing with TalkShow**

76 **MacroMedia: Cool 3-D Modeling**

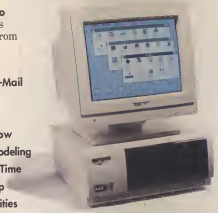
81 **Snozzy Charts in Record Time**

84 **WinProbe: A $49 Tune-Up**

86 **Full-Service Graphics Utilities**

98 **Composer's Splashy Graphics**

101 **The First Celebrity PIM?**



PAGE 58 ALR'S SIZZLING PENTIUM PC

106 **Portable Multimedia PCs**

110 **True Color at Warp Speed**

112 **CypherScan Kills the Rolodex**

122 **WinFax Pro: Smart Network Faxing**

126 **Access Multiple CD-ROM Drives**

128 **Saber Software: The LAN Tamer**

132 **A Save for LAN Administrators**

136 **Commence: The Automated PIM**

146 **Picks and Pans on CD-ROM**

40 **MVP Finalists**

148 **PC/C Update**

152 **Best Bets**

154 **Software Saleswire**

429 **SpecWatch/Direct to You**

Columns

34 **Ed Bott**
When the bean counters get tough, the tough get going.

43 **Letters**
The final word on word processors and assaults on OS/2 hype.

156 **John C. Dvorak**
Can the glitz—only boring computer TV shows will win.

158 **Gil Schwartz**
It's extremely heavy. It's my graphically superb org chart.

166 **Dvorak vs. Somerson**
Sure, paper publishing is evil waste, but media junkies prefer it.

546 **Penn Jillette**
At last, here's the math behind encryption.

Help

370 **DOS**
Five tips that let you take control of your keyboard.

371 **DOS Hot Tips**
Create multiple directories with one command.

378 **Windows**
Diagnose application errors with Dr. Watson.

382 **Windows Hot Tips**
Switch video modes instantly.

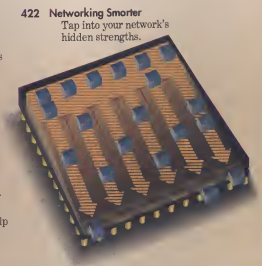
388 **Software Secrets**
Mine your programs for productivity by tapping their hidden resources.

404 **How It Works**
CISC vs. RISC processors.

406 **Q&A**
Crack your riddles with help from PC/C's answer guys.

421 **How to Join PC/Contact**
Instructions for accessing free software, PC tips, and more on our online forum.

422 **Networking Smarter**
Tap into your network's hidden strengths.



PAGE 404 CISC vs. RISC PROCESSORS

COVER PHOTOGRAPH BY ROBIN GINSBERG

PRODUCT INDEX ▶

Product Index

PRODUCTS FEATURED IN THIS ISSUE
FOR FREE INFORMATION ON THESE PRODUCTS, CIRCLE THE CORRESPONDING READER SERVICE NUMBERS ON THE REPLY CARD ON PAGE 513.

PRODUCTS BY ARTICLE

To request information on all the products in one article, circle the corresponding number on the reply card on page 513.

Page Number — Reader Service

177 .....Windows Superguide.....887
Our 48-page Windows Superguide.

298 .....Perfectly Portable PCs 888
Compudyne 4SL/25 SubNote, Dauphin DTR-1, Epson ActionNote 4000, IBM ThinkPad 500, Twinhead SubNote 486SLC, and Zeos Contendo.

316 .....The Best Word Yet 889
Microsoft Word 6.0 for Windows.

332 .....Amazing Data Grazing 890
Borland International Quattro Pro 5.0 for DOS, Borland International Quattro Pro 5.0 for Windows, Computer Associates CA-Compete 5.0, Computer Associates CA-SuperCalc, Lotus 1-2-3 for DOS, Lotus 1-2-3 4.0 for Windows, Lotus Improv 2.1, Microsoft Excel 4.0 for Windows.

COMPUTER SYSTEMS

Page Number — Name/Company — Reader Service

MULTIMEDIA PORTABLES

106.....Dalch Mach M486-66C _____ 621
Dalch Computer

106.....ThunderBax 486/66VLE Portable ___ 622
Lightning Computer

106.....Toshiba T6600 CDV _____ 623
Toshiba

MULTIMEDIA SYSTEMS

58.....ALR Evolution V _____ 603
Advanced Logic Research

58.....Gateway 4DX2-66V _____ 604
Gateway 2000

58.....Tri-Star 486-VL Multimedia Solution _____ 605
Tri-Star Computer

SUBNOTEBOOKS

302.....Compudyne 4SL/25 SubNote _____ 676
Compudyne

302.....Dauphin DTR-1 _____ 677
Dauphin Technology

303.....Epson ActionNote 4000 _____ 678
Epson America

303.....ThinkPad 500 _____ 679
IBM

304.....Twinhead SubNote 486SLC _____ 680
Twinhead

304.....Zeos Contendo _____ 681
Zeos Int'l

PERIPHERALS

CD-ROM DRIVES

150.....NEC Multispin CD-ROM Readers ___ 651
NEC Technologies

CD-ROM SERVERS

126.....Discport _____ 627
Microtest

FAX MODEMS

150.....Intel FaxModem Family _____ 645
Intel

GRAPHICS ACCELERATOR CARDS

148.....AudioGraphix _____ 646
Genoa Systems

110.....GXE Apex _____ 624
Number Nine Computer

148.....Pro Graphics accelerators _____ 647
Media Vision

152.....Warp accelerators _____ 655
Volante

LASER PRINTER CARTRIDGES

150.....Laser Pro Remanufactured Laser Cartridges _____ 650
Laser Pro

NETWORKING

145.....WaveLAN _____ 631
Digital Equipment Corp.

POWER CONSUMPTION

148.....ManitarMiser _____ 637
Technology Marketing Partners

PRINTERS

150.....Canon BJ-200 Bubble Jet _____ 648
Canon Computer Systems

150.....MicroMarc _____ 649
Texas Instruments

PRINTERS—POSTSCRIPT LASER

62.....Brother HL-6 _____ 606
Brother Int'l

62.....LaserJet 4P _____ 607
Hewlett-Packard

62.....Silentwriter SuperScript 610 _____ 608
NEC Technologies

62.....Okidata OL400E _____ 609
Okidata

WINDOWS SOFTWARE

CD-ROM TITLES

150.....Moon Valley ROMaterial _____ 643
Moon Valley Software

146.....Murmurs of Earth: The Voyager Interstellar Record _____ 632
Time Warner Interactive Group

146.....Shareware Extravaganza _____ 634
Crosley Software

146.....Space Quest IV-Roger Wilco and the Time Rippers _____ 673
Sierra On-Line

146.....Type Treats _____ 633
Roynbow Software

DATABASE UTILITIES

419.....Microsoft Database Access Pack _____ 899
Microsoft

DRAWING (VECTOR-BASED)

150.....Designer 4.0 _____ 640
Micrografx

Continued on page 12

Thomas W. Judd
President of Curtis Manufacturing

The Curtis Solution— The Total Solution.

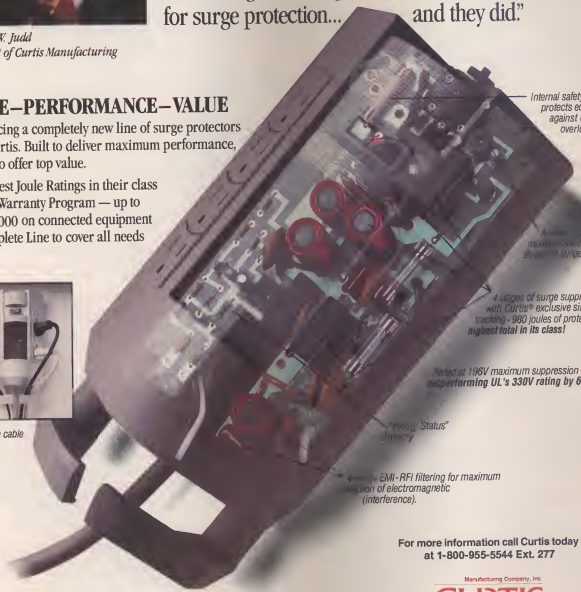
"I challenged our engineers to build a complete answer for surge protection... and they did."

PRICE—PERFORMANCE—VALUE

Introducing a completely new line of surge protectors from Curtis. Built to deliver maximum performance, priced to offer top value.

- Highest Joule Ratings in their class
- Full Warranty Program — up to $25,000 on connected equipment
- Complete Line to cover all needs

Moided-in cable organizer



For more information call Curtis today at 1-800-955-5544 Ext. 277

Manufacturing Company, Inc.

CURTIS

30 Fitzgerald Drive, Jaffrey, NH 03452

©copyright 1993, Curtis Mfg. Co., Inc. All Rights Reserved

Product Index

Continued from page 10

Page Number — Name/Company — Reader Service

E-MAIL MANAGEMENT

64.....**E-Mail Connection** ____ 610
Connect Software

FAX SOFTWARE

122.....**WinFax Pro for Networks** ____ 626
Delrina Technology

FINANCIAL MANAGEMENT

67.....**Quicken 3.0 for Windows** ____ 612
Intuit

FONTS

104.....**FontMinder 2.0** ____ 620
Ares Software

GRAPHICS/PRESENTATION

98.....**Altamira Composer** ____ 671
Altamira Software

86.....**Collage Complete** ____ 669
Inner Media

86.....**Graphics Tools** ____ 670
DeltaPoint

152.....**Harvard Graphics 2.0** ____ 654
Software Publishing

76.....**Macromodel for Windows 1.5** ____ 616
Macromedia

81.....**SnapGrafx** ____ 617
Micrografx

81.....**Visio 2.0** ____ 618
Shapeware

NETWORKS/UTILITIES

132.....**AlertView 2.1** ____ 629
Shony Computer

128.....**Saber LAN Workstation** ____ 628
Saber Software

OCR SOFTWARE

150.....**WordScan 2.0** ____ 644
Calera Recognition Systems

OPERATING SYSTEMS

152.....**Windows 3.1** ____ 663
Microsoft

52.....**Windows NT 3.1** ____ 601
Microsoft

PERSONAL INFORMATION MANAGERS

136.....**Commence 2.0** ____ 667
Jensen-Jones

101.....**Shorkwore** ____ 672
CognTech

PRINT SPOOLERS

422.....**Disk Spool II** ____ 900
Budget Software

411.....**PrintQ** ____ 897
Zenographics

411.....**Superprint** ____ 896
Zenographics

PRINTER ENHANCEMENTS

411.....**Windows Printing System** ____ 898
Microsoft

SCANNING SOFTWARE

112.....**CypherScan Line** ____ 625
CypherTech

SECURITY

145.....**SecurExchange** ____ 630
Datomedia

SPREADSHEETS/UTILITIES

368.....**CA-Compete 5.0** ____ 689
Computer Associates Int'l

332.....**Excel 4.0 for Windows** ____ 684
Microsoft

332.....**Lotus 1-2-3 4.0 for Windows** ____ 685
Lotus Development

368.....**Improv 2.1** ____ 690
Lotus Development

148.....**Lucid 3-D for Windows** ____ 638
Lucid

332.....**Quattro Pro for Windows 5.0** ____ 683
Borland Int'l

TELECONFERENCING

74.....**TalkShow** ____ 615
Future Labs

UTILITIES

150.....**Central Point Backup 2.0 for Windows** ____ 641
Central Point Software

148.....**Magee Automenu 5.0** ____ 636
Magee Enterprises

280.....**Uninstaller 2.0** ____ 675
MicroHelp

378.....**VB System Information** ____ 895
Snowy Mountain Software

152.....**WindowMagic** ____ 652
WinWear

192.....**Windows Driver Library** ____ 674
Microsoft

84.....**WinProbe 2.1** ____ 668
Landmark Research Int'l

150.....**WinSleuth Gold Plus** ____ 642
Doriano Software

104.....**WinTools 1.1** ____ 619
Tool Technology Publishing

VIDEO

72.....**Adobe Premiere** ____ 613
Adobe Systems

72.....**MediaMerge** ____ 614
ATI Technologies

WORD PROCESSORS/TEXT UTILITIES

148.....**PC-Write 4.1** ____ 639
Quicksoft

152.....**Word for Windows 2.0** ____ 664
Microsoft

316.....**Word 6.0 for Windows** ____ 682
Microsoft

152.....**WordPerfect for Windows** ____ 666
WordPerfect

DOS SOFTWARE

FINANCIAL MANAGEMENT

67.....**Quicken 7.0 for DOS** ____ 611
Intuit

OPERATING SYSTEMS—DOS

152.....**DOS 6.0 Upgrade** ____ 656
Microsoft

SPREADSHEETS/UTILITIES

363.....**CA-SuperCalc** ____ 686
Computer Associates Int'l

152.....**Lotus 1-2-3 3.4** ____ 658
Lotus Development

363.....**Lotus 1-2-3 for DOS** ____ 687
Lotus Development

363.....**Quattro Pro for DOS 5.0** ____ 688
Borland Int'l

UTILITIES

150.....**Central Point Backup 8.0 for DOS** ____ 641
Central Point Software

152.....**Norton Utilities 7.0** ____ 660
Symantec

370.....**LCD** ____ 894
Keith Ledbetter

152.....**QEMM-386** ____ 661
Quarterdeck Office Systems

WORD PROCESSING

152.....**WordPerfect 6.0** ____ 665
WordPerfect

152.....**Word 6.0** ____ 659
Microsoft

OS/2 SOFTWARE

OPERATING SYSTEMS

52.....**OS/2 2.1** ____ 602
IBM

WORD PROCESSORS/TEXT UTILITIES

148.....**WordPerfect 5.2 for OS/2** ____ 635
WordPerfect

BUY AN OKIDATA PRINTER TODAY, AND YOUR BUSINESS WILL TAKE OFF.

THE OKIDATA FLIGHTPLAN
UNITED AIRLINES

Introducing The Okidata FlightPlan Offer. Buy An Okidata Printer To Boost Your Business And Until December 31, Get A United Airlines Discount Up To $100.

Not only have Okidata printers rewritten the book on outstanding output and reliability; between now and December 31, 1993 Okidata and United Airlines are teaming up to help you and your business go farther. Here's how.

When you purchase an Okidata 24-Pin Dot Matrix printer or LED Page Printer, you will receive a United Airlines travel certificate. If that's not enough, Okidata now features the brand-new OL400e. It's the perfect personal printer for individual PC users. The OL400e offers fast LED output, compact size, an unbeatable 5-year printhead warranty and a surprisingly affordable price.

Depending upon the printer you buy, you'll earn a discount of $25-$100 on United Airlines (see chart at right). Just get a claim form from your nearest Okidata dealer (for the Okidata dealer nearest you, call 1-800-OKI-TEAM, EXT. 316). Full Okidata FlightPlan details are on the claim form. Make your flight plan right now, and prepare for your business to take off.

DISCOUNT CERTIFICATE AMOUNT	*$25*	*$50*	*$100*
Printer Model	ML 380	ML 590, ML 591, OL400e	ML 395, ML 395C, OL830, OL830Plus, OL850
Certificate Usage	Valid for a ticket of $200+	Valid for a ticket of $300+	$50 each on two tickets of $300+
Discount Travel Certificate is assignable; Saturday night stay not required; no blackout dates apply.			

UNITED AIRLINES

OKIDATA Reg. T.M. M.D. Oki Electric Industry Company, Ltd.

Circle 175 on reader service card.

OKIDATA®
a Division of Oki America, Inc.

If *(wait)* this *(wait)* is *(wait)* how

(wait) your *(wait)* computer *(wait)*

does *(wait)* Windows, *(wait)*

have *(wait)* we *(wait)* got *(wait)* a

(wait) PC *(wait)* for *(wait)* you.

NEC Image 466

Don't wait. Put one of our Image™ Series 486 PCs on your desk immediately. You'll get Windows performance that really screams

And we're not the only ones who feel that way. In a recent review of the Image Series, *PC World* wrote, "Say goodbye to waiting in Windows."

NEC pioneered local bus video technology to speed up graphics-based applications like Windows. Today, as other makers develop first generation local bus video, we offer advanced, second-generation technology

Making it fast. Our ingenious Image Video™ technology combines second-generation local bus video with a powerful graphics accelerator, so even the most complex, most demanding graphics applications run full blast. And with our True Color support for over 16.8 million colors and photo-realistic images, those applications will have the impact of a speeding freight train. The bottom line: Your productivity takes a fast turn skyward. Our new Image PCs are built for easy, 238-pin ZIF-socket upgrades to the next generation of Pentium-based Intel OverDrive™ processors. We've also given them an on-board SCSI II interface, for quick connections to a wide range of peripherals.

NEC Image 433

But wait: it gets even better. In addition, NEC's OptiBus™ technology can make those peripherals perform up to 30% faster than ordinary systems. While our ImageSync™ feature delivers flawless, flicker-free images with no adjusting when used with one of our award-winning MultiSync® FG™ monitors.

The NEC Image Series. Just part of a whole family of great personal computers, from our affordable PowerMate® PCs, to our expandable Express™ servers. So (why wait?), call 1-800-NEC-INFO or NEC FastFacts™ at 1-800-366-0476, request document 46243.

NEC Image 425

intel inside

PC WORLD BEST BUY

NEC Image 466
May 1993

IMAGE VIDEO

Circle 275 on reader service card.

Because ⬆ is the way you want to go.

NEC

NEC-SEARSBOOK-NO6341

COMING SOON

PCComputing

The 1993 MVP Awards

Meet the industry elite—winners of *PC/Computing*'s 1993 Most Valuable Product Awards. Our editors scrutinized thousands of products to single out the most innovative and technologically advanced players in the market. For a sneak preview of this year's finalists, turn to page 40.

Hot Tips for Ten Top Apps

You won't wring out your next productivity boost by hunting through quick-reference guides or on-line help. We've identified ten undocumented solutions for ten of the most common business apps so you can troubleshoot programs like Excel, Ami Pro, and Word for Windows with flair. Learn how to overcome time-consuming bottlenecks using *PC/Computing*'s quick but powerful tweaks for your favorite DOS or Windows app.

Usability Labs Tour

Before you break the seal on your next license agreement or shell out bucks for that crucial hardware buy, you're bound to prove what those hard-won budget dollars are going to get you. Turn to *PC/Computing*'s state-of-the-art Usability Labs to determine which products will really satisfy your productivity demands. Next month, our editors take you on a guided tour of the facility that's become the hallmark for objective real-world evaluations.

Gil Schwartz's Gift Guide

Once again, Gil sports his wit and inimitable wisdom in this humorous seasonal shopping spree. Find out why Gil's favorite products made the cut—and which ones would make great additions to your holiday list.

Also coming in December: The right way to accelerate and compress your hard drive, and new multimedia machines.

PCComputing

EDITOR-IN-CHIEF Paul Somerson

PUBLISHER Jonathan Socks

EDITOR

Bill Roberts

FEATURES

SENIOR EDITORS Marty Jerome, John Montgomery, Denise E. M. Penrose, Wendy Taylor
ASSOCIATE EDITORS Kyle K. Carlson, Christine Grech
ASSISTANT EDITOR Lisel La Grange
EDITOR-AT-LARGE Preston Gralla

NEWS AND REVIEWS

REVIEWS EDITOR Sebastian Rupley
SENIOR EDITOR Mike Hogan (News)
ASSOCIATE EDITORS Cyndy Bates, Matthew J. Lake, Shyamala Reddy
ASSISTANT EDITOR Anita Dennis

HELP

SENIOR EDITOR Scot Finnie
ASSOCIATE EDITOR Dylan Tweney
ASSISTANT EDITOR Chris Sandlund

LABS/TECHNICAL

SENIOR TECHNICAL EDITOR/LAB DIRECTOR Adam Meyerson
ASSOCIATE TECHNICAL EDITOR John Teschek
USABILITY LAB MANAGER Martin Marshall
TEST MANAGER Nathan Garcia
PROJECT LEADER Robert Bayley
INVENTORY COORDINATOR Ibrahim Gul

SENIOR CONTRIBUTING EDITORS

Ed Brott, Ron White

CONTRIBUTING EDITORS

George Beinhorn, Carol Olsen Day, John C. Dvorak, Mike Falkner, Robert Hummel, Penn Jillette, Woody Leonhard, Brian Livingston, Stephen Manes, Sally Neuman, Jeff Pressler, Winn L. Rosch, Gil Schwartz, Chris Shipley

EDITORIAL PRODUCTION

MANAGING EDITOR Debra McDonald
ASSISTANT MANAGING EDITOR Lori A. Uzzo
ELECTRONIC PUBLISHING MANAGER Mark C. Li
SENIOR COPY EDITOR Deborah A. Gravitz
COPY EDITORS James Cary, Kim Gallegos
PRODUCTION EDITOR Laura Wolf
RESEARCH EDITOR Richard Schwerin

ART AND DESIGN

ART DIRECTOR Michael Yapp
ASSOCIATE ART DIRECTOR Allyson Appen
SENIOR DESIGNER Jeannette Hodge
DESIGNER/ILLUSTRATOR Timothy Edward Downs
DESIGNER Regan Honda
ART ASSOCIATE Peggy Smith

MARKETING AND SALES

ASSOCIATE PUBLISHER Nancy Newman
DIRECTOR OF MARKETING William P. Howard
GENERAL BUSINESS MANAGER Anne H. Ashmead
SUBSCRIPTION DIRECTOR Charles Mast
SINGLE COPY SALES AND MARKETING DIRECTOR James E. Gerth
SALES DEVELOPMENT MANAGER Tomax Hospel
MARKETING INFORMATION SPECIALIST Kimberly Black
EVENTS MANAGER Julie Giasso
EVENTS COORDINATOR Caryl Deering

ADMINISTRATIVE

EXECUTIVE EDITORIAL ASSISTANT Patti McCaffrey
EDITORIAL ASSISTANTS Jezzelle Cox, Ilan Greenberg
EXECUTIVE ASSISTANT TO THE PUBLISHER Marilyn Flannigan
ASSOCIATE PUBLISHER'S ASSISTANT Melissa Eckhelm
MARKETING ASSISTANT Katrina Harris
RECEPTIONIST Melanie McCullough

PRODUCTION

PRODUCTION DIRECTOR Carlos Lugo
PRODUCTION MANAGER Stephen DeLacy
ASSISTANT PRODUCTION MANAGER Monique L. Riese

ZIFF COMMUNICATIONS COMPANY

CHAIRMAN William B. Ziff, Jr.
VICE PRESIDENT AND SPECIAL ASSISTANT TO THE CHAIRMAN Bruce R. Barnes
SENIOR VICE PRESIDENT Steven C. Feinman
VICE PRESIDENT, GENERAL COUNSEL AND SECRETARY J. Malcolm Morris
VICE PRESIDENT, BUSINESS MANAGER T. L. Thompson
VICE PRESIDENT, CHIEF INFORMATION OFFICER Thor Olsen
CONTROLLER AND TREASURER Timothy J. Mitchell

HOW TO CONTACT THE EDITORS

Address questions and feedback to 950 Tower Lane, 19th Floor, Foster City, CA 94404. Better yet, reach us electronically via MCI Mail (350-2648) or via PC/Contact on CompuServe (76000,21); refer to page 421 for in-depth instructions). Or, telephone us at (415) 578-7000. If you buy a product advertised in PC/Computing, are dissatisfied, and can't resolve the problem, write (please do not call) Marilyn Flannigan, Executive Assistant, PC/Computing, at the above address. Include copies of all correspondence. PC/Computing is under no obligation to review unsolicited products. All unsolicited submissions become the property of PC/Computing. If you want to write for PC/Computing, send a query letter, along with samples of your published writing, to Bill Roberts, Editor.

SUBSCRIPTION INQUIRIES/CHANGE OF ADDRESS

For subscription service questions, address changes, or how to order: Call toll-free (800) 365-2770 in the U.S. and Canada; or (303) 447-9330 for all other countries; or write to PC/Computing, P.O. Box 58229, Boulder, CO 80322-8229. The subscription rate is $24.97 for one year (12 issues). Canada and all other countries require an additional $16 for postage. For back issues (subject to availability), send a check or money order for $7 ($8 outside the United States) to Back Issues Department, Ziff-Davis Publishing Company, P.O. Box 5315?, Boulder, CO 80322-3131.

PC/COMPUTING ON CD-ROM

PC/Computing is available as part of Computer Select, a CD-ROM published by Computer Library. Each monthly issue of Computer Select contains the full text of the most recent year's issues and more than 60 other leading computer-industry publications. For subscription information call Computer Library at (800) 827-7899, extension 708.

PC/Computing (ISSN 0899-1847) is published monthly by Ziff-Davis Publishing Company, a division of Ziff Communications Company, One Park Ave., New York, NY 10016. Second Class postage paid at New York, NY 10016 and at additional mailing offices. Postmaster: Send address changes to PC/Computing, P.O. Box 58229, Boulder, CO 80321-8229. Printed in the U.S.A. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 278513. The Canadian GST registration number is R123669673.

GET A GATEWAY AND...
GET EXTREME!

GET THE HIGHEST PERFORMANCE

Gateway 2000 Goes To Extremes!

You never get middle-of-the-road performance or value from Gateway 2000. We've always had a reputation for going to extremes to be the ***best*** at giving you the ***highest*** performance and the ***latest***-technology machines, at the ***biggest*** value you can find. We try to think of everything we do in superlatives. Just look what this means for you...

The Gateway P5-60

Introducing the ultimate, pinnacle-of-performance Gateway 2000 P5-60, our super-powered PC, based on Intel's® Pentium™ processor. It's the absolute maximum PC performer available today...at a typical Gateway how-low-can-they-go price of under $4,000! And we haven't faltered on features to give you this incredible price. The P5-60 is loaded with the latest and greatest of technologies — Intel's Pentium CPU, a screaming PCI bus, a 528MB hard drive, 16MB RAM, a 2X CD-ROM drive with a data transfer rate of 300KB per second, along with a 17-inch color monitor, new tower case, and all the extras that come with every Gateway 2000 PC.

Budget-conscious buyers can get the exceptional performance of the Gateway P5-60 at a great savings with our Best Buy system — a remarkable value at $2,995! This radical machine combines Pentium-based power and performance for your future at an affordable price. Plus, it's fully configured and loaded to the max with features. Check it out!

CPU Performance

Intel's Pentium processor's 64-bit superscalar architecture moves instructions and data twice as fast as 486s — jumping to incredible heights of performance never achieved before. The Pentium processor has 16KB of internal cache, and the motherboard has 256KB of cache.

New PCI Bus Technology

You'll achieve paramount performance with the P5-60's high-tech PCI bus. It's the bus of the future, here today. PCI subsystems are 10-15% faster than comparably configured VESA® subsystems. In addition to PCI performance, you also get the benefits of PCI's "plug and play" feature. Now you can add a modem, network cards, video cards and other peripherals without ever having to reconfigure your system. The PCI bus's 32-bit, high-performing and robust interface is the only logical choice to take full advantage of a Pentium CPU-based system's potential.

AT THE LOWEST PRICES

Extreme Graphics

Gateway has always lead the industry in graphics performance, and the P5-60 is no exception. You get the best overall graphics performance available on the market with the new ATI™ Ultra XLR 2MB on the PCI bus. And the unique architecture of the XLR 2MB allows the card to interleave 2MB of DRAM and achieve true 24-bit color at 640 x 480 and 800 x 600 resolutions.

2X CD-ROM

To top it off, we've added a 2X CD-ROM drive to the P5-60. This latest CD-ROM drive transfers data at 300KB per second, twice as fast as a standard CD-ROM drive.

Tower Case

The P5-60 comes standard in Gateway 2000's new, smaller tower case, taking you to new levels of expandability. It has five external drive bays, five internal drive bays and a 300-watt power supply.

For the ***utmost*** in performance and the ***best*** investment for your future computing needs, the P5-60 is the only system for you! When it comes to being the industry's value leader, Gateway 2000 has always been a jump ahead of the competition. Call a Gateway sales representative today for more information on the P5-60.

Gateway's new tower case measures only 22.9-inches high, 9.9-inches wide and 18.6-inches deep. The tower case is also available as an upgrade for our VESA and new EISA/VESA systems.

GATEWAY 2000

"You've got a friend in the business."®

800-846-2062

The Bettman Archive

The Bettman Archive

GET THE MOST BANG

You get all the bells and whistles in one great package with Gateway 2000's feature-and power-packed VESA local bus 486 systems. We've always made the biggest bang in the industry with these outstanding machines. You get the expandability you'll need to continually upgrade your system to tomorrow's technology. We're proud to toot our own horn about these local bus PCs. They're a rare combination of everything-you-need at a fantabulous price.

Hard Drives

Just like closet space, you can never have enough hard drive space. Our 4DX-33V, 4DX2-50V and 4DX2-66V systems have whopping 424MB hard drives. Our 32-bit local bus IDE with exclusive RIDE BIOS provides you with the industry's leading disk throughput.

Video Performance

Although everyone tries to catch us, they can never keep up. Our latest ATI Ultra XLR 2MB video card still sets the standard for VESA graphics. With its unique architecture, the XLR allows the card to interleave 2MB of DRAM and achieve true 24-bit color at 640 x 480 and 800 x 600 resolutions.

The Ultra XLR also comes with special drivers to accelerate tomorrow's video and multimedia applications.

Cache

Secondary caches unlock the full performance potential of your CPU. Gateway VESA systems come standard with 128KB cache, and the award-winning DX2-66V has 256KB cache.

Your Choice Of Software

Only Gateway gives you a choice of top-shelf application software. VESA local bus and PCI systems include options such as Microsoft® Word for Windows,™ MS Excel,™ Borland® Paradox® and Quattro® Pro for Windows. Then we add Central Point's Tools on Top™ utility software, based on the award-winning PC-Tools for Windows. Systems with a CD-ROM drive include Gateway's System CD containing Microsoft's Multimedia Pack,™ the Gateway Mall and much more. All software is pre-installed on your system at no extra charge.

FOR THE FEWEST BUCKS

AnyKey® Keyboard

Don't settle for a rigid 101-keyboard when you can have the flexibility of Gateway's exclusive 124-key AnyKey keyboard with programmable macros and keyboard remapping capabilities.

intel inside

CD-ROM Drive

All DX2 VESA systems come standard with a CD-ROM drive, giving you access to exciting new applications, databases and entertainment programs. All Gateway systems can be easily upgraded to include a CD-ROM.

Expandability

For those of you who still want to jazz up your PC ensemble, we're giving you all the instruments you need for expansion. You get four external drive bays for floppies, a CD-ROM drive, tape backup, and don't forget all the media of the future. Three internal drive bays allow you to easily add hard drive space. Two VESA slots assure upgradeability to tomorrow's totally cool graphics and disk controller technology; and five ISA slots are compatible with 16-bit technologies.

Gateway has always had a reputation for marching ahead of the crowd by giving you the ***greatest*** values. Our award-winning VESA systems are no exception!

Standard with VESA systems is our new Baby AT case measuring 16.9-inches wide, 6.6-inches high and 16.8-inches deep.

GATEWAY2000

800-846-2062

GET THE BIGGEST VALUE

The tall and short of it is: Gateway 2000 elevates value to enormous levels on our integrated mini desktop systems...but still gives you pint-sized prices. We've gone to extremes to bring you all new mini desktop configurations with colossal features and performance in a new case. Whether you need a 486SX-25 processor, a 486DX2-66 processor, or anything in-between, Gateway has the system for you. And with prices lower than ever, you get a huge value without having to pay an arm and a leg.

Big Performance/Little Prices

Check out Gateway's new 4DX2-66 mini desktop — it's a small package that packs a big punch for under $2,000! While other companies might slash their prices, you could get the short end of the stick when it comes to features. Gateway won't short-change you on anything. You get a 66MHz 486DX2 processor, 128KB cache, a 424MB hard drive, 4MB RAM and fast video performance. Our 4SX and 4DX models come standard with Microsoft Works™ for Windows; 4DX2 models come with an extended selection of application software. And all mini desktop models come standard with MS DOS® 6 and MS Windows™ 3.1. All application software comes pre-installed on the hard drive at no extra charge.

Local Bus Video

Our new integrated local bus video provides up to twice the video performance found in our previous mini desktop systems. In fact, Gateway's mini desktop video performance is similar to that found in many of our competition's high-end systems. With up to 1MB video DRAM, you get 1024 x 768 resolution and an array of colors. All this on our 14-inch CrystalScan non-interlaced, .28mm dot pitch color monitor.

Price/Performance

How can we give you all these features at such low prices? Gateway's engineers went out on a limb to design our mini desktops to include many subsystems incorporated on the motherboard. This means less cost to us, and a giant savings for you!

ON OUR SMALLEST DESKTOP SYSTEMS

Increased Expandability

You won't have any growing pains with Gateway's new integrated mini desktop cases. They're small, but you get more flexibility and expandability than ever before. These cases come with one internal and one external 3.5 inch drive bays, and two external 5.25 inch drive bays so you can add a tape backup, CD-ROM drive or another floppy drive. You also get five expansion slots: more than you'll find in most small footprint PCs. And all Gateway mini desktop systems are upgradeable to Pentium technology.

With the *coolest* features at miniature prices, our mini desktop systems give you an unbeatable value. Call your Gateway sales representative today for more information on these power-packed mini desktop systems.

You get greater expandability with our new mini desktop cases, measuring 16.9-inches wide, 4.4-inches high and 15.9-inches deep.

GATEWAY 2000

"You've got a friend in the business."®

800-846-2062

GET THE HARDEST HITTING MULTIMEDIA

Although it looks difficult, you can easily put a multimedia spin on your Gateway PC by purchasing our specially priced multimedia kit. With it you can access the most powerful productivity packages, the most realistic games and the latest multimedia applications.

Multimedia Upgrade kit

Everything you need to add multimedia to your PC is included in this specially priced kit! You get:

Sound Blaster™ 16 Sound Card with Advanced Signal Processing.

Simply the best sound card available! This 16-bit PC audio card offers CD-quality sound. Yamaha® FM music synthesizer, MPU-401 MIDI interface, joystick connector, built-in CD-ROM interface, and more. The Advanced Signal Processing chip delivers 4:1 real-time hardware data compression while reducing CPU demands by up to 65%. Provides 100% compatibility with all Sound Blaster applications, plus DOS and Windows sound support. You also get two Labtec® speakers that attach to your PC monitor.

Double-Speed CD-ROM Drive.

Kit comes with a high-performance double-speed CD-ROM drive. When you're not using it to run computer programs, it can play your favorite music CD's. You also get our free system CD with Microsoft Multimedia Pack™ and more!

Kit Price: $395 (with system purchase)

Altec Lansing Speakers ACS-300 with Subwoofer

Get superior stereo sound with these top-rated Altec Lansing Speakers. This system includes two magnetically shielded, powered two-way satellite speakers and a separately powered subwoofer which uses a unique multi-path acoustic chamber design. The digital signal processing (DSP) circuitry creates full rich sound, presence and ambiance. **$219** (with system purchase)

Software

Check out our latest software titles too. This new wave of exciting applications will forever change the way you learn, work and play!

THAT IS EASIEST ON YOUR BUDGET

MECC Education Pack

MECC, one of the leaders in education software has bundled four of their most exciting programs including: The Oregon Trail; Money Works/Clocks; Story Book Weaver; and Super Munchers. **$59** (with system purchase)

Just Grandma and Me™

Watch your child's eyes light up with one of the most popular interactive, animated stories for children on the market. Just Grandma and Me is a multimedia smorgasbord of sound effects, music and animations. **$42** (with system purchase)

The TIME Almanac 1993

Experience tomorrow's technology with the TIME almanac. This package now offers a comprehensive collection of 15,000 TIME magazine articles and nearly 60 minutes of current and historical videos. **$75** (with system purchase)

Microsoft Encarta Encyclopedia

Where typical encyclopedias end, Microsoft Encarta begins. Bringing learning to life with words, images, animations and sounds, Encarta includes the complete text of the 29-volume 1992 Funk and Wagnall's New Encyclopedia. **$249** (with system purchase)

Call for details on other exciting software packages.

intel inside

GATEWAY2000

"You've got a friend in the business."®

800-846-2062

GET THE STRONGEST SERVICE AND SUPPORT

We're committed to bending over backward to please our customers. Gateway employees understand that there may be a time when your computer makes you feel a little weak in the knees. Never fear — our Midwestern people know the importance of a friendly voice and a helpful attitude on the other end of the phone.

Every Gateway system comes with excellent after-the-sale support. You get a **30-day money-back guarantee**. So, if you're not completely satisfied with your system, you can send it back within 30 days for a refund.

All Gateway 2000 systems have a **one-year limited warranty** and telephone **technical support for the life of the system**. When you need help with your PC, you want someone who will jump through hoops to help you. That's what you'll get with our support departments.

Gateway's **automated fax service** will supply you with detailed documentation on over 150 technical subjects. You'll also get **a lifetime BBS membership** for additional technical support and on-line forums.

We offer **on-site service** to most locations in the country (factory service only for notebooks). And **replacement parts** leave our factory as quickly as possible; we pay overnight shipping. For details on our guarantee, warranty and on-site service programs, please call for a free written copy of our policies.

We also make it easy for you to buy a Gateway PC, with **convenient payment options** including major credit cards and C.O.D. terms. Net 30-day terms and leasing options are also available to qualified commercial customers.

Energy Star Program

The Environmental Protection Agency's Energy Star Program is fast becoming the industry standard in the "green" movement. PCs and monitors with the Energy Star logo are capable of consuming 30 watts or less of electricity. All Gateway 2000 desktop systems, with the exception of our new Pentium-based PCs, are EPA Energy Star compliant.

Introducing The Gateway DuoLine MasterCard® Card

Here's another value-added way to get the latest technology: the Gateway 2000 DuoLine MasterCard now available only through Gateway 2000.

This innovative card enables you to make purchases from Gateway and anywhere else MasterCard is accepted, by giving you two lines of credit — one for Gateway purchases and one for all other purchases. For Gateway purchases, the card has no annual fee and a low variable interest rate of just 12.9% APR. For purchases elsewhere, you get a variable interest rate of 13.9% APR and a low $18 annual fee.* If you already have a MasterCard, you may also apply for a Gateway DuoLine MasterCard. Lines of credit will vary by individual. For an application, call 800-846-1781.

**Cash advance fee is $1 plus 2% of the amount of the cash advance, but not less than $5 nor more than $10. The Gateway 2000 Duoline MasterCard is issued by Dial National Bank.*

FOR YOUR WEAKEST MOMENTS

At Gateway 2000, we strive to be extremists when it comes to bringing you the ***highest***-performance systems, with the ***most*** features at the ***lowest*** prices...for the ***greatest*** value in the PC industry. We are committed to giving you the ***strongest*** after-the-sale support. And we will continue to find the ***"greenest"*** ways to increase energy efficiency and protect the environment. Call your Gateway 2000 sales representative today!

GATEWAY2000

"You've got a friend in the business."®

800-846-2062

a Gateway...
intel inside

GATEWAY 2000'S COOLEST PCS

4SX-33

- Intel® 25MHz 486SX Processor
- 4MB RAM
- 3.5" Diskette Drive
- 212MB 13ms IDE Hard Drive
- Intel Pentium™ Technology Ready
- Local Bus Graphics Accelerator w/ 512KB DRAM
- 14" Color CrystalScan® 1024NI
- New Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard
- Microsoft® Mouse
- MS-DOS,®Windows™ & Tools
- MS Works for Windows™ 2.0
- EPA Energy Star Compliant

$1295 4SX-25 **$1275**

4DX-33

- Intel 33MHz 486DX Processor
- 4MB RAM
- 3.5" Diskette Drive
- 212MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 512KB DRAM
- 14" Color CrystalScan 1024NI
- New Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- MS Works for Windows 2.0
- EPA Energy Star Compliant

$1495

4DX2-50

- Intel 50MHz 486DX2 Processor
- 4MB RAM, 128KB Cache
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- New Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey®Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1795

4DX2-66

- Intel 66MHz 486DX2 Processor
- 4MB RAM, 128KB Cache
- 3.5" Diskette Drive
- 424MB 13ms IDE Hard Drive
- Intel Pentium Technology Ready
- Local Bus Graphics Accelerator w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- New Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1995

4SX-33V

- Intel 33MHz 486SX Processor
- 4MB RAM
- 5.25" & 3.5" Combo Drive
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator w/1MB DRAM
- 14" Color CrystalScan 1024NI
- New Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1495

4DX-33V

- Intel 33MHz 486DX Processor
- 8MB RAM, 128KB Cache
- 5.25" & 3.5" Combo Drive
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator w/1MB DRAM
- 14" Color CrystalScan 1024NI
- New Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$1995

4DX2-50V

- Intel 50MHz 486DX2 Processor
- 8MB RAM, 128KB Cache
- 3.5" Diskette Drive & CD-ROM
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB ATI™ Ultra XLR 2MB Graphics
- 15" Color CrystalScan 1572FS
- New Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$2295

66MHz Best Buy

- Intel 66MHz 486DX2 Processor
- 8MB RAM, 128KB Cache
- 3.5" Diskette Drive & CD-ROM
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB Graphics Accelerator w/1MB DRAM
- 15" Color CrystalScan 1572FS
- New Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$2495

4DX2-66V

- Intel 66MHz 486DX2 Processor
- 16MB RAM, 256KB Cache
- 3.5" Diskette Drive & 2X CD-ROM
- 424MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- Intel Pentium Technology Ready
- VLB ATI Ultra XLR 2MB Graphics
- 15" Color CrystalScan 1572FS
- New Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software
- EPA Energy Star Compliant

$2995

P5-60 Best Buy

- Intel 60MHz **Pentium**™ Processor
- 8MB RAM, 256KB Cache
- 3.5" Diskette Drive & 2X CD-ROM
- 424MB 13ms IDE Hard Drive
- PCI ATI Ultra XLR 2MB Graphics
- 14" Color CrystalScan 1572FS
- New 300W Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- MS Works for Windows 2.0

$2995

P5-60

- Intel 60MHz **Pentium**™ Processor
- 16MB RAM, 256KB Cache
- 3.5" Diskette Drive & 2X CD-ROM
- 528MB 12ms IDE Hard Drive
- PCI ATI Ultra XLR 2MB Graphics
- 17" Color CrystalScan 1776FS
- New 300W Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS-DOS, Windows & Tools
- Choice of Application Software

$3995

Software Choices

If a system comes with "choice of application software," choose one of the following packages:

- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf'92,® CD-ROM Edition
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- The MS Entrepreneur Pack(Works, Publisher, Money, and games)
- Borland Paradox® and Quattro®Pro for Windows

Due to the volatility of the DRAM market, all prices are subject to change.

Gateway 2000 is a corporate sponsor of Global Reflect

Printed on recycled paper with soy inks.

Energy Star EPA POLLUTION PREVENTER

GATEWAY2000

"You've got a friend in the business."®

800-846-2062

Caviar

intel inside

610 Gateway Drive • P.O.Box 2000 • North Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561

Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

AND THE HOTTEST SOFTWARE & PERIPHERALS

SOFTWARE

Microsoft Office™ — You can upgrade from a choice of application software to Microsoft Office, CD-ROM version, for only **$99**! This single package has all the leading Windows applications: Word, Excel and PowerPoint.

Choice of Application Software—If the system you want comes with MS Works for Windows, you can upgrade to a choice of application software for only **$100**.

COMMUNICATIONS

TelePath™ II Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 9,600bps fax capability. Package includes data and fax communication software plus a CompuServe® trial membership. **$159**

Cardinal® 2400 Fax/Modem

Internal fax/modem, 2,400bps modem, V.22bis, with 9,600bps fax capability. Package includes QModem and WinFax Lite. **$49**

Intel EtherExpress™

The one board you can use for all your Ethernet adapter needs. Providing 8- and 16-bit support for twisted-pair, thin-and thick-wire Ethernet cabling, it sets a new performance standard for 16-bit LAN adapters by providing full support for standard network operating systems.
$105 *Twisted Pair or BNC Kit (BNC Kit includes cable, connector, terminator and card)*

Gateway 2000 Ethernet Adapter

This third-generation adapter manufactured by 3Com features parallel tasking architecture which speeds up packet processing and improves adapter performance. Plus, its high level of integration greatly reduces the number of discrete components, lowering cost and increasing reliability.
$105 *Twisted Pair*
$125 *BNC Kit (includes cable, connector, terminator and card)*

Colorado Memory Systems™ TBU

250MB internal automatic tape backup unit copies up to 9.5MB per minute with high-speed data compression. Comes with easy-to-use DOS software, one tape and cable. **$175**

MONITORS

CrystalScan® 17-Inch Monitors

Non-interlaced, color monitor. If your system comes with a 14-inch monitor, you can upgrade to this monitor for $600. If your system comes with a 15-inch monitor, you can upgrade for **$520**. *(Prices good only for upgrades at the time of system purchase.)*

Gateway CrystalScan 2076LE

This high-performance, 20-inch, .30 dot pitch color monitor is perfect for CAD, imaging and graphic design. It has a maximum resolution of 1280 x 1024 at 80Hz refresh, plus it features a Trinitron CRT and Super Fine Pitch™ aperture grille for bright images and vibrant colors. You can upgrade to the 20-inch monitor for **$1,590** if your system comes with a 14-inch monitor. If your system comes with a 15-inch monitor you can upgrade for **$1,510**. *(Prices good only for upgrades at the time of system purchase.)*

PRINTERS

Panasonic® KX-P2123 Color-Capable Printer

Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager.®
KX-P2123 **$259**
KX-P2123 Color Option **$50**

Epson® Stylus™ 800 Ink Jet Printer

Great laser quality at an even greater value. Measuring only 17 inches by 10.5 inches, the Stylus 800 has 7 different typefaces and prints an extra-quiet 150 characters per second at 360 dpi Parallel cable included.

Gateway 2000 Price	$339
Epson Mail-In Rebate*	-$50
After Rebate Cost	$289

*Your mail-in rebate will be delivered with your Epson printer. This special price is only good for orders taken through October 31, 1993.

Epson ActionLaser 1500 Laser Printer

Superior output in a high-quality laser printer. The ActionLaser delivers professional-quality printouts with crisp, sharp images, black blacks and smooth, "jag-free" lines. It also features a fast six-page per minute print speed, 14 resident fonts, 300 x 300 dpi, and 1MB memory expandable to 5MB. Parallel cable included. **$669**

The software and peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

We offer many other system options and upgrades. Call today!

SERVICE

Every Gateway 2000 system is backed by:

- 30-Day Money-Back Guarantee
- One-Year Limited Warranty
- Lifetime Toll-Free Technical Support
- On-Site Service Available to Most Locations
- Lifetime BBS Membership
- FaxBack® Automated Fax Service

Details about our warranty, guarantee and on-site service program are available upon request.

MICROSOFT® WINDOWS™ READY-TO-RUN

TOOLS TOP FROM CENTRAL POINT

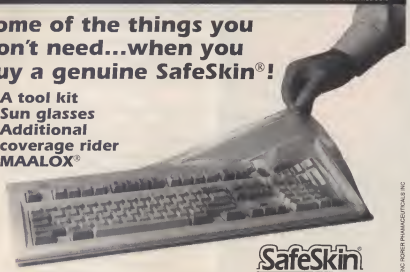
Tools on Top™ is now included on all Gateway 2000 mini desktop, desktop and tower systems. Program includes file manager, desktop and emergency disk portions of Central Point's award-winning PC Tools for Windows.

©1993 Gateway 2000, Inc. AnyKey, CrystalScan, black-and-white spot design, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and Gateway 2000 and TelePath are trademarks of Gateway 2000, Inc.
The Intel Inside Logo, Intel and Pentium are trademarks or registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies.
Prices and configurations are subject to change without notice. Prices do not include shipping

Merritt
COMPUTER PRODUCTS

Some of the things you don't need...when you buy a genuine SafeSkin®!

1. A tool kit
2. Sun glasses
3. Additional coverage rider
4. MAALOX®



SafeSkin®
KEYBOARD PROTECTOR

When you buy a genuine SafeSkin®, you buy a complete, custom molded, high precision, type through keyboard cover.

1. With a SafeSkin®, you don't get a 'some assembly required' do-it-yourself kit. You do get a complete product, ready to install and go to work.

2. With SafeSkin® you don't get a shiny plastic cover that blinds you from the glare! SafeSkin®'s surface is specially treated with a non-glare finish for easy readability in all lighting conditions.

3. With SafeSkin®, you don't get half a cover. You get the whole enchalada. SafeSkin® wannabes sell products that only partially cover the keyboard. SafeSkin® wraps completely around the keyboard and attaches underneath to give maximum protection.

4. When you insist on a genuine SafeSkin®, you also get our ten years of experience and innovation. There are over 1000 different models available, and we are experts at identifying the correct one for you.

©1993, Merritt Computer Products, Inc.
MAALOX® is a registered trademark of RHONE-POULENC RORER PHARMACEUTICALS INC

Merritt Computer Products, Inc. • 5565 Red Bird Center Dr., Suite 150 • Dallas, Texas 75237 • (214) 339-0753 or FAX (214)339-1313

Circle 102 on reader service card.

The faster you call us, the sooner you'll learn about the best printer sharing product available.

INSTANT INFO
Call 24 hours
1-800-373-3600
Ask for #1011
We'll fax you the whole story.

SmartPrint™
Printer Sharing Network
"So Smart, it's Simple"

Circle 107 on reader service card.

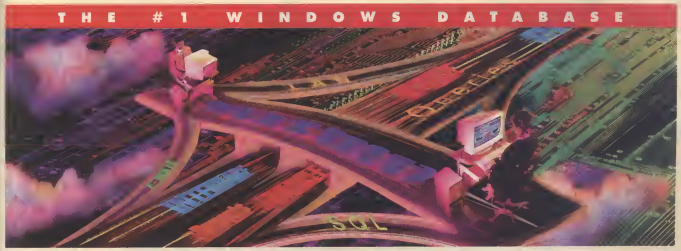
PC Computing

ZIFF-DAVIS PUBLISHING COMPANY

CHAIRMAN AND CEO Eric Hippeau
PRESIDENT J. Scott Briggs
PRESIDENT, ZIFF-DAVIS DOMESTIC PUBLICATIONS GROUP Ronni Sonnenberg
EXECUTIVE VICE PRESIDENT, CENTRALIZED OPERATIONS GROUP Mike Edelhart
EXECUTIVE VICE PRESIDENT, INTERNATIONAL J. B. Holston III
GROUP VICE PRESIDENT, CONTROLLED CIRCULATION PUBLICATIONS Claude P. Sheer
GROUP VICE PRESIDENT, PAID CIRCULATION PUBLICATIONS Jeff Ballowe
SENIOR VICE PRESIDENT, CIRCULATION Baird Davis
SENIOR VICE PRESIDENT, MARKETING Paul H. Chook
SENIOR VICE PRESIDENT Rachel Greenfield
VICE PRESIDENT, CENTRAL ADVERTISING SALES Bob Bader
VICE PRESIDENT, CIRCULATION SERVICES James F. Rumsey
VICE PRESIDENT, CONTROLLER Howard Schalnik
VICE PRESIDENT, CREATIVE SERVICES Herbert Stern
VICE PRESIDENT, EUROPE Frank Kelcz
VICE PRESIDENT, HUMAN RESOURCES Royna Brown
VICE PRESIDENT/MANAGING DIRECTOR MAGAZINE NETWORKS Joseph Gillespie
VICE PRESIDENT, MARKETING SERVICES Ann Pollock Adelman
VICE PRESIDENT, NEW PROJECTS AND STRATEGIC PLANNING Robert D. Ziff
VICE PRESIDENT, OPERATIONS Dirk Ziff
VICE PRESIDENT, PRODUCTION Roger Herrmann
VICE PRESIDENT, RESEARCH Rolf M. Wulfsberg
VICE PRESIDENT, TECHNOLOGY William B. MacKenzie
VICE PRESIDENT, ASSISTANT TO THE CHAIRMAN Scott Huey
VICE PRESIDENT Jim Stafford
VICE PRESIDENT Don Byrnes
VICE PRESIDENT Louis B. Dotti, Jr.
CHIEF INFORMATION OFFICER Wellington Y. Chiu
GENERAL MANAGER Bruce W. Bourne
ASSISTANT TO THE CHAIRMAN Tom McGrade
EXECUTIVE DIRECTOR, INFORMATION SYSTEMS Owen Weekley
EXECUTIVE DIRECTOR, MARKETING SERVICES Jim Manning
DIRECTOR OF LICENSING Jean Lomensdorf
DIRECTOR OF PLANNING Gary A. Gustafson
PRODUCTION DIRECTOR Walter J. Tarlecki
DIRECTOR OF SALES TRAINING Don Leonetti
DIRECTOR OF CORPORATE MARKETING Susan Delmon
EDITORIAL DIRECTOR Lewis D'Vorkin
CO-DIRECTORS, ZD BENCHMARK OPERATION Bill Catchings, Mark L. Von Narne
DIRECTOR, DIRECT MARKETING PROGRAMS Alicia Marie Ivons
DIRECTOR OF PUBLIC RELATIONS Gregory Jarboe

ADVERTISING OFFICES

PC/Computing serves its advertisers from eight offices throughout the United States. *PC/Computing* is an independent journal, not affiliated in any way with the International Business Machines Corporation. *PC/Computing* is a registered trademark of Ziff-Davis Publishing Company, L.P. The following are trademarks of Ziff-Davis Publishing Company, L.P.: *American Computing, Fast Facts, The Magazine for Business Computing Experts, PC/Contact, PC Sources, Perfect 10, Personal Computing, Pro Tips, Software Secrets,* and *The Ultimate PC*. Entire contents © 1993 by Ziff-Davis Publishing Company, L.P. All rights reserved.



New Paradox makes your desk a ramp on the data superhighway

New Version 4.5

There's lots and lots of data out there. The trouble is, it has to go to the right place in order to be productive. That's the reason why we developed the new Paradox® Workgroup Edition. The only database with superior SQL connectivity and workgroup information sharing.

Share data easily with any workgroup

First we built in support for SQL servers* so you can work with information from corporate databases as if it were on your desktop. Then we added the Workgroup Desktop to distribute the data where it's needed. Now anyone with a Workgroup Edition of Paradox® can exchange data over local and wide area networks, or via electronic mail.† You can establish and modify workgroups instantaneously to meet the needs of a given project.

Everything you need is built right in!

Best Windows database for all skill levels

Of course, no new version of Paradox would be complete without enhancements to the powerful and easy-to-use features that have made it the #1-rated Windows database. Built-in productivity Experts™ guide you at every step, from linking tables to building forms and reports. Object Inspector™ menus provide instant access to capabilities without searching through layers of menus. Paradox's ease of use stays with you as you move up the power curve. Corporate developers find that ObjectPAL,™ the fully integrated programming language, lets you create custom Windows applications that are powerful, graphical, and deliverable *fast*. Plus, 100% compatibility with Paradox DOS means your existing Paradox data will migrate automatically to your new Windows application.

SQL

When it comes to workgroup database productivity, nothing gets you where you want to go faster or easier than the new Paradox Workgroup Edition from Borland.

Welcome to life in the fast lane.

Limited-time offer!

$495 *Suggested retail price for new users.*

$149.95 *Upgrade price for Paradox, FoxPro, Access, Superbase, and Approach users. $20 rebate for Paradox Windows 1.0 owners.*

90-day, money-back guarantee

See your dealer today or call 1-800-336-6464, ext. 7508

In Canada, call 1-800-461-3327.

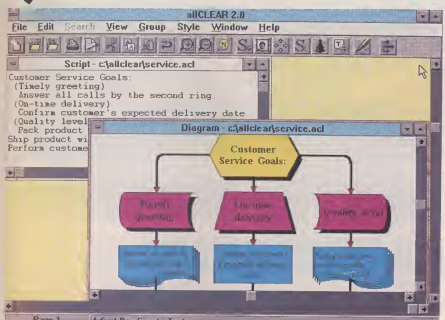
Borland

Power made easy™

Circle 218 on reader service card.

Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. Offer good in the United States and Canada only. All prices in U.S. dollars. Dealer prices may vary. *Including Borland's InterBase,™ SYBASE/Microsoft SQL, and ORACLE servers. †Novell Message Handling Service (MHS and NGM); MCI Mail; cc:Mail; Windows for Workgroups, MS-Mail, and other MAPI-compliant messaging services; Local Area Network (LAN) systems, such as Novell NetWare, Banyan, IBM® LAN Server, MS-LAN Manager, AT&T StarGROUP, and other peer-to-peer networks. BI 5815

Your flowcharting tools just became obsolete.



Introducing allCLEAR for Windows: the only software that *automatically* draws flowcharts from text.

You have a new procedure and you need to chart it. You're sitting at your PC. You key in several lines of text. Suddenly, bingo! — there's a flowchart on the screen.

All your boxes are correctly shaped and sized. Even the text is properly aligned. Connecting lines are neatly plotted and drawn, complete with arrows and "yes/no" labels. *And you never drew a single line.*

Welcome to automatic flowcharting—with allCLEAR for Windows. Whether you need simple process diagrams or complex, multi-page charts, it lets you create them far more easily than any tool you're using now, in a fraction of the time. With unheard-of flexibility.

allCLEAR for Windows allows you to easily customize sections or entire flowcharts. Choose from more than 150 shapes, diagram and line styles. Select fonts, control colors and shading, rotate and size elements. Place text or images anywhere you like.

Even last-minute revisions won't rattle allCLEAR for Windows. Just edit your text, and it automatically re-draws, re-routes and re-sizes.

This new state-of-the-art flowcharting tool comes complete with a 60-day no-risk guarantee for only $299.95. Network and DOS versions are available, too. Phone now for your free allCLEAR for Windows Info Kit with full details, samples and color brochure.

Call now for your free Info Kit: 1-800-338-1759

CLEAR Software, Inc.
385 Elliot Street, Newton, MA 02164

Circle 183 on reader service card.

PCComputing

ADVERTISING SALES OFFICES

NEW ENGLAND
Patrick O'Brien, District Manager
10 Presidents Landing
Medford, MA 02155, (617) 393-3306
Debra Donovan, Account Representative (415) 578-7068

MID-ATLANTIC
District Manager
One Park Ave.
New York, NY 10016, (212) 503-4907
Monica Sembler, Account Representative (415) 578-7067

MIDWEST
Thomas Rousseau, District Manager
150 North Wacker Dr., Suite 2500
Chicago, IL 60606, (312) 214-7333
Rick Burish, Account Representative (415) 578-7065

SOUTHEAST
Thelia Kanakhisas, District Manager
3405 Piedmont Rd. NE., Suite 460
Atlanta, GA 30305, (404) 814-8960
Kim Marshall, Account Representative (415) 578-7072

SOUTH CENTRAL
Peter Muller, District Manager
5956 Sherry Ln., Suite 625
Dallas, TX 75225, (214) 360-5755
George Carney, Account Representative (415) 578-7056

SOUTHWEST
John T. Larson, Jr., West Coast Regional Manager
18301 Von Karman Ave., Suite 330
Irvine, CA 92715, (714) 852-5912

Michael J. King, District Representative
3530 Wilshire Blvd., Suite 645
Los Angeles, CA 90010, (213) 351-1853
John R. DeSpirito, Account Representative (415) 578-7066

SAN FRANCISCO BAY AREA/PACIFIC NORTHWEST
Kelly Wernli, District Representative
950 Tower Ln., 19th Floor
Foster City, CA 94404, (415) 578-7061
Account Representative (415) 578-7070

SAN JOSE
Phil Kramer, District Manager (415) 578-7073
Suzanne Raider, District Manager (415) 578-7060
950 Tower Ln., 19th Floor
Foster City, CA 94404
Anne Dewling, Account Representative (415) 578-7058

MARKETPLACE SALES OFFICE
ZiFDavis Publishing Company
One Park Ave., 3rd Floor
New York, NY 10016, (800) 825-4237

SALES MANAGEMENT

ADVERTISING SALES MANAGER William B. Wise (415) 578-7052
ADVERTISING DIRECTOR/EAST COAST Sloan Seymour (617) 393-3305
ADVERTISING COORDINATOR Andrew G. Adebisi (415) 578-7031
ADMINISTRATIVE ASSISTANT Rebecca Schuett (415) 578-7017
SALES COORDINATOR Lisa Shea
SALES ASSISTANTS Heidi Cerenzie, Sara Ciming, Erving Dackery, Laura Lawless, Caroline March-Long, Sandy Marcinick, Francie Mare, Bennett Schneider, Lisa Shea, Jennifer Williams

PERMISSION AND REPRINTS

Material in this publication may not be reproduced in any form without permission. Written requests for permission should be addressed to Carol Peters. For information on reprints in quantities of 500 or more, call Carol Peters, ZiFDavis Publishing Company, One Park Ave., New York, NY 10016. Printed in the U.S.A. Canadian GST registration number is R123669673.

The Audit Bureau

"ALR's EVOLUTION VQs have certainly made the most out of existing technology." *IDC Weekly Update - May 20, 1993*

"A stylish tower system, the ALR EVOLUTION VQ incorporates more new hardware features than any other machine reviewed here." *PC Magazine UK- July, 1993*

Pentium Processor Power From Just $2495

"Best of Show, Spring Comdex, 1993" *BYTE Magazine- May, 1993*

PC Computing MVP FINALIST

PC MAGAZINE *PC Magazine- June 15th 1993*

intel inside pentium PROCESSOR

Systems shown from left to right: ALR EVOLUTION VQ/60 & EVOLUTION V

The Intel iCOMP Index 60 — *40% greater performance is now only $1 more than our comparably configured 33-MHz i486DX systems!*

ALR EVOLUTION IV 4/50d

RockerChip FREE LOCAL BUS GRAPHICS*

Prices Start at **$1,365**

Call ALR For Other Pricing and Custom Configurations

*Limited time offer on ALR EVOLUTION IV DX-based systems only

"Fast, compact, nicely designed... a solid desktop choice." *InfoWorld July 5, 1993*

- High-end power at an affordable price
- 2 VESA local bus slots for enhanced compatibility and performance
- WD33 local bus graphics for high speed Windows™ computing
- Ample expandability for challenging applications such as image processing, data management, and high-end multimedia
- An upgrade path to Pentium Technology and ALR's revolutionary 5 Year/3 month warranty provide true investment protection
- EISA and ISA bus architectures available

ALR FLYER VL 4/50d

RockerChip

Prices Start at **$1,460**

Call ALR For Other Pricing and Custom Configurations

"The power-saving capability earns no price premium." *PC Week June 7, 1993*

- Remarkably affordable 50-MHz computing
- Integrated accelerated local bus graphics (WD33 RocketChip) for outstanding Windows performance
- Energy saving design helps lower your electric bill while protecting a better environment
- VESA local bus slot for enhanced compatibility and performance
- 5 Year/3 month warranty provides long term peace of mind

We could talk for days about how great our new EVOLUTION V family is. We could fill up pages detailing why these 64-bit Pentium processor powerhouses are the most revolutionary systems to hit the microcomputer industry in years. But frankly, it's easier for us to just quote the industry experts. After all, these folks live, breathe and dream computers, so if something impresses them, you know it has to be good.

Yet these systems are more than just award winners. The EVOLUTION V family continues ALR's eight year history of delivering state-of-the-art technology at unbeatable prices — a tradition shared by our entire family. Backed by our industry leading 5/15 warranty, the entire ALR product line delivers an unbeatable combination of performance, service, and value.

The ALR EVOLUTION VQ/60 & EVOLUTION V

Technology designed from the inside out

While most of today's Pentium processor systems are merely upgraded versions of existing 32-bit i486-based PCs, the ALR EVOLUTION V and the EVOLUTION VQ were engineered from the ground up to take full advantage of this advanced, 64-bit CPU. With support for the Pentium processor's wider data path and high performance write-back mode, these powerful systems easily outperform their less sophisticated competitors.

The ALR EVOLUTION VQ System Board Technology

1. 60 or 66 MHz Pentium Processor
2. QuickBus 128 Architecture (ALR Custom ASIC) which Dual 64-bit Path cache to Memory Supports Pentium Write-Back Mode
3. Dual 256 KB (512 KB cached) 64-bit megatrend Write-back Cache
4. 16-MB RAM(Expandable to 1GB) True 64-bit Data/Memory Path
5. Ten 32-bit EISA Expansion Slots
6. 3 VESA VL Local Bus Slots Also Includes: 13 Drive Bays 415 Watt Power Supply

1. 60-MHz Pentium Processor Supports Pentium Write-Back Mode
2. 8-MB RAM(Expandable to 128-MB), True 64-bit Data/Cache/Memory Path
3. Integrated 256-KB Write-back Cache
4. Integrated MULTIUS (Multi-ranking) IDE Controller
5. Six EISA Expansion Slots
6. 3 32-bit VESA VL Local Bus Slots Also Includes: Six Drive Bays 300 Watt Power Supply

The ALR EVOLUTION V System Board Technology

For more information or to order please call

800-444-4ALR

ALR can be reached on Compuserve -- GOALRINC

ALR

Advanced Logic Research, Inc.

9401 Jeronimo Irvine, CA 92718 (714) 581-6770 FAX: (714) 581-9240

Some systems shown with optional monitors. Prices, specifications and configurations are subject to change without notice. Verify competitive pricing with manufacturer. Prices based on U.S. dollars. ALR is a registered trademark of Advanced Logic Research. Inc. intel inside logo is a trademark of Intel Corp. All other brand and product names are trademarks or registered trademarks of their respective owners. ©1993 by Advanced Logic Research, Inc.

Circle 142 on reader service card.

When the Bean Counters Get Tough, the Tough Get Going

IT'S NOT A PRETTY SIGHT. YOUR BUDGET JUST SCRATCHED AND clawed its way through the corporate gauntlet and landed, much the worse for wear, back on your desk. The CFO calls it lean and mean; anyone who worries about keeping PC users productive would call your new Clinton-era hardware budget scrawny and emaciated.

Blame it on the IRS, which continues to insist that computers have a useful life of five years. That means all those 1990-vintage 386SXs aren't eligible for replacement until sometime in 1995. They barely run Windows, and their dinky 40MB hard drives have trouble holding a single new application, much less an Office or a Suite full. But as long as there's an ounce of depreciation left, those boxes will sit on desktops, slowly driving people crazy. How will you survive 1994?

If you can't replace the box all at once, try doing it one piece at a time. Most of the time, upgrades make lousy economic sense, since nowadays you can buy a new PC cheaper than you can build one from parts. And then you have to factor in the high cost of labor and the hassles of making all the new pieces work with the old ones. But bean counters and IRS auditors don't really care whether your budget makes sense. What follows are some tips on how to play the game by their rules and still get your way.

Piece by Piece

Which upgrades should you focus on first? It's just a matter of prioritizing, with the bottom line constantly in mind.

Memory If you do nothing else, make sure every system has at least 4MB of memory. RAM isn't quite the dirt-cheap bargain it was last year at this time; prices for SIMMs have been careening around like a roller coaster ever since a suspicious fire on July 6 at a Japanese resin factory. Even at temporarily inflated prices, though, a few megabytes of extra RAM is still the cheapest upgrade you can make, and anything you can do to keep Windows from turning to the hard disk for virtual memory is worth it. If you buy it one megabyte at a time, you can probably get reimbursed from petty cash.

Hard Drives These days, fast 120MB IDE drives are so cheap that I fully expect to see gas stations giving 'em away free with every full-service fill-up. The sweet spot is around 200MB, where for well under $300 you can get the drive and a speedy new disk controller. You spend an hour on the upgrade, and you get five times the storage capacity and twice the performance, plus enough breathing room to get you through this budget cycle.

Video We're talking triage here; if the old system in question has a VGA adapter, it's probably good enough and isn't a high priority. But you'll want to replace any 14-inch monitor that has a dot pitch of 0.39mm or greater. Just fill out a P.O. for a few new 17-inch, low-radiation monitors and pass it along to the CFO. Make sure you attach a daunting stack of news clippings about the potential for nasty class-action lawsuits by workers exposed to unnecessary radiation on the job. There's nothing that frightens an accountant more than the thought of having to deal with lawyers.

Single-Chip CPU Upgrades Intel's OverDrive processor is a great idea. Trouble is, an OverDrive chip fits only in a 486 socket, and if you had a 486 socket you'd probably already have a 486 in it. What to do? Turn to Cyrix instead. Purists may quibble over whether Cyrix makes a "true" 486, but they can't argue with the results. Simply plug in the Cyrix 486 upgrade to a 386 motherboard and you'll crank up performance by better than 60 percent; best of all, you can replace any old 386DX for a street price of around $300 or less. By the time you read this, there'll be clock-doubled CPU upgrades from Cyrix that will let you give your old 386SXs a new lease on life, too, even if they're soldered on to the motherboard. You can reach Cyrix at (800) 327-6289. (Comparison shoppers take note: Upgrade products that use the Texas Instruments 486DLC upgrade are cheaper, but they may cause cache coherency problems when installed.)

New Motherboard It's a radical concept, and not for the faint of heart, but why not just swap the old motherboard for a brand-new one? Figure on spending $700 or less: For that relative pittance, you should get a brand-new BIOS, a 33MHz 486 CPU, a couple of local-bus slots, and 4MB of RAM. When you fill out the requisition, just call it *spare parts.*

When you're done, don't be surprised if you've replaced everything except the case and the keyboard. You're happy, and you're also under the budget, which makes the guys in Finance happy, too.

Bean counters and IRS auditors don't care if your budget makes sense

A Personal Note

For the past year, I've written this column as editor of *PC/Computing.* Beginning this month, I write as the magazine's newest senior contributing editor. The longer title means a shorter work week, more time writing this column and feature-length articles, looking at new products, and keeping up with mail from readers. I leave the day-to-day operations in the capable hands of Bill Roberts, whose nearly two decades of experience at *Corporate Computing, PC Week, UnixWorld,* and several daily newspapers guarantee that *PC/Computing* will continue to tell it like it is.

PHOTOGRAPH BY RICHARD ANDERSEN

ZEOS® Hot Local Bus 486DX2

PC Computing, March 1993

Now Get The Fastest PCs... Delivered *Fast!*

ORDER BY 1 O'CLOCK GUARANTEED WE'LL SHIP TODAY

OUR GUARANTEE TO YOU:

If we accept your order for immediate shipment and fail to ship your system under the conditions outlined, we will ship it *at our expense* as soon as it is ready.*

IT'S AS EASY AS:

1 Choose what ZEOS system package you want. (A sampling of what's available is shown below.)

2 Call ZEOS at 800-554-5218. For same day shipping, place your order before 1 p.m. Central Time, Monday through Friday.

3 Upon credit approval, we'll ship your system *the same day you order!*

486SX-25

486DX-33

486DX2-66

486DX2-66

PACKAGE #2:

- 4MB RAM
- 214MB local bus hard drive with built-in 128K cache
- Windows-accelerated local bus video
- SVGA color monitor
- Both floppies
- DOS, Windows, Mouse
- Choice of Windows application

$1695

PACKAGE #3:

- 8MB RAM
- 426MB local bus hard drive with built-in 128K cache
- Windows-accelerated local bus video
- SVGA color monitor
- Both floppies
- DOS, Windows, Mouse
- Choice of Windows application

$2295

PACKAGE #3 BONUS:

- 8MB RAM
- 256K SRAM cache
- 528MB local bus IDE hard drive
- Diamond Viper local bus video card
- 15" SVGA color monitor
- Both floppies
- 14,400 bps V.32 bis send/receive fax modem
- DOS, Windows, Mouse
- Choice of Windows application

$2995

PACKAGE #4 PLUS:

- 16MB RAM
- 528MB local bus hard drive with built-in 256K cache
- Diamond Viper local bus video card
- Vertical case
- 15" SVGA color monitor
- Both floppies
- DOS, Windows, Mouse
- Choice of Windows application

$3334

These are just a few of our local bus upgradable packages. Look on the following pages for additional money-saving packages or custom configurations.

CALL NOW TOLL FREE
800-554-5218
24 HOURS A DAY

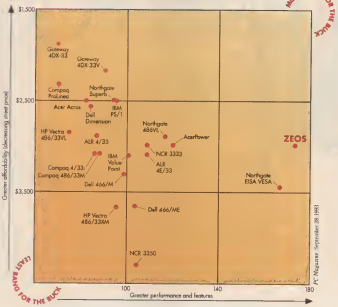
ZEOS INTERNATIONAL, LTD.

*Orders must be for ZEOS *Computers Now!*™ configurations, we've listed just a sampling here. Since we continuously add to this list of configurations, *please call to confirm your system is on the list.* This offer is good only as long as these pre-built systems remain in stock. Other ZEOS systems and configurations take slightly longer—about a week. Credit cards are subject to authorization. Orders must be received by 1 p.m. Central Time, M-F.

Circle 248 on reader service card.

PC MAGAZINE REVEALS:

The Computer That Gives You The Most Bang For The Buck.



ZEOS 486DX2-66... THE TOP GUN $2995

- Genuine Intel 486DX2-66 microprocessor, upgradable to Pentium™ OverDrive™
- 8MB RAM expandable to 64MB
- 256K SRAM system cache
- 528MB local bus IDE hard drive
- Diamond Viper/VLB local bus video card with 1MB VRAM
- 1.2MB and 1.44MB floppy drives
- 15" ZEOS color SVGA non-interlaced monitor, .28mm dot pitch
- MS-DOS 6 with Enhanced Tools, Windows, and new Microsoft Mouse, plus choice of Lotus Windows applications
- 14,400 bps V.32 bis send/receive fax modem
- SAME DAY SHIPPING

Others pale in comparison. There's no way to dispute it! The results are in, and the ZEOS Upgradable 486DX2-66 is "the overall performance winner."

PC buyers expect low prices, top-quality, impeccable performance and prompt support. Basically, they want the most bang for their buck. *PC Magazine* recognized this and compared value-line PCs with more traditional systems to see if they were "truly good values or stripped-down machines trying to pass for good buys." The results are overwhelmingly in ZEOS' favor. In fact, *PC Magazine* said: *"ZEOS doesn't sell a separate value line, but the flexibility of its main system may be the least confusing solution of all."*

intel inside

Stacked against Gateway, Dell, Compaq, IBM and others, ZEOS stood alone. Using the Benchmark Tests as a guide, *PC Magazine* made these conclusions:

"As DOSmark scores are heavily weighted for processor and hard disk performance, the ZEOS garnered the first-place position in each as well."

"The clear winner is...the ZEOS Upgradable, which turned in an incredible score of 55.01 megapixels per second."

"The real highlight among tested hard disks was the Seagate ST3600A, which has 12-ms access time and 256K of built-in cache. The ZEOS 486DX2-66 Upgradable's hard disk performance was almost 31 percent above the average in this roundup."

Of the *"systems that demonstrated the best agility under strenuous exercise of all their components... ZEOS (scored) 26 percent above average."*

The ZEOS local bus upgradable systems are the perfect solution—the brand-new motherboard is faster, more integrated, versatile and reliable than ever. Plus, ZEOS is always thinking ahead to your

STANDARD WITH EVERY ZEOS UPGRADABLE SYSTEM

- Upgradable to Intel's Pentium™ OverDrive™ CPU. Zero Insertion Force (ZIF) socket makes upgrading easy.
- RAM expandable to 64MB on the motherboard.
- Two serial ports and one parallel port integrated on the motherboard.
- Flash BIOS for easy upgradability.
- Eight expansion slots: two VESA local bus, five 16-bit and one 8-bit.
- ZEOS six-bay desktop case with two cooling fans for increased reliability and product life.
- High-capacity power supply with built-in surge suppression; switchable between 115/230V.
- Socket for inexpensive optional on-board SCSI.
- Shadow RAM support.
- ZEOS 101-key space-saving keyboard.
- FCC Certified Class B; UL Listed.
- Complete ZEOS Customer Satisfaction Package.

PACKAGE 1	PACKAGE 2	PACKAGE 3	PACKAGE 4
486SX-25 $1395 Lease $59/month	**486SX-25 $1695** Lease $61/month	**486SX-25 $1995** Lease $72/month	**486SX-25 $2495** Lease $90/month
486SX-33 $1495 Lease $63/month	**486SX-33 $1795** Lease $65/month	**486SX-33 $2095** Lease $76/month	**486SX-33 $2595** Lease $94/month
486DX-33 $1695 Lease $61/month	**486DX-33 $1995** Lease $72/month	**486DX-33 $2295** Lease $83/month	**486DX-33 $2795** Lease $101/month
486DX2-50 $1795 Lease $65/month	**486DX2-50 $2095** Lease $76/month	**486DX2-50 $2395** Lease $87/month	**486DX2-50 $2895** Lease $105/month
486DX2-66 $1895 Lease $69/month	**486DX2-66 $2195** Lease $79/month	**486DX2-66 $2495** Lease $90/month	**486DX2-66 $2995** Lease $108/month
■ ZIF socket upgradability to Pentium OverDrive CPU	■ ZIF socket upgradability to Pentium OverDrive CPU	■ ZIF socket upgradability to Pentium OverDrive CPU	■ ZIF socket upgradability to Pentium OverDrive CPU
■ 2MB high-speed RAM	■ 4MB high-speed RAM	■ 8MB high-speed RAM	■ 16MB high-speed RAM
■ 107MB local bus IDE hard drive w/32K cache	■ 214MB local bus IDE hard drive w/128K cache	■ 426MB, 13ms local bus IDE hard drive w/128K cache	■ 528MB, 12ms local bus IDE hard drive w/256K cache
■ Diamond SpeedStar Pro Windows-accelerated VL local bus video with 1MB RAM. 16.7 million colors.	■ Diamond SpeedStar Pro Windows-accelerated VL local bus video with 1MB RAM. 16.7 million colors.	■ Diamond SpeedStar Pro Windows-accelerated VL local bus video with 1MB RAM. 16.7 million colors.	■ Diamond SpeedStar Pro Windows-accelerated VL local bus video with 1MB RAM. 16.7 million colors.
■ ZEOS 14" 1024 x 768 N1 SVGA color monitor, .28mm dot pitch	■ ZEOS 14" 1024 x 768 N1 SVGA color monitor, .28mm dot pitch	■ ZEOS 14" 1024 x 768 N1 SVGA color monitor, .28mm dot pitch	■ ZEOS 14" 1024 x 768 N1 SVGA color monitor, .28mm dot pitch
■ Your choice of floppy drives	■ Both 1.2MB and 1.44MB floppy drives	■ Both 1.2MB and 1.44MB floppy drives	■ Both 1.2MB and 1.44MB floppy drives
■ MS-DOS 6 plus Enhanced Tools	■ MS-DOS 6, Tools, Windows & new Microsoft Mouse, plus choice of Lotus Windows application	■ MS-DOS 6, Tools, Windows & new Microsoft Mouse, plus choice of Lotus Windows application	■ MS-DOS 6, Tools, Windows & new Microsoft Mouse, plus choice of Lotus Windows application

FAVORITE OPTIONS

426MB to 528MB HDD UPGRADE.....**$190**

256K SYSTEM CACHE.....**$98**

ADAPTEC 6360 SCSI CONTROLLER CHIP
For on-board SCSI. Includes drivers **$49**

2400 bps V.42 bis MODEM WITH 9600 bps SEND/RECEIVE FAX.....**$99**

DIAMOND VIPER VIDEO CARD
1MB VRAM: **$149** 2MB VRAM: **$249**

15-INCH MONITOR UPGRADE
SVGA non-interlaced, 1024 x 768, flat screen.....**$95**

COMPLETE MULTIMEDIA PACKAGE
MPC compliant, multi-session CD-ROM, 16-bit/48KHz Cardinal Digital Sound Pro 16 with Digital Signal Processor (Soundblaster and Adlib compatible), and stereo speakers.....**$395**

Many other affordable upgrades and options available. Call for details!

future needs and technological advances; therefore, we include such features as CPU upgradability to Intel's Pentium OverDrive; a Zero Insertion Force (ZIF) CPU socket, Flash BIOS for easy upgradability, and a SCSI upgrade socket for adding SCSI without having to use a slot. We've even given you room to grow with eight expansion slots and six drive bays.

Choose from one of our money-saving packages, or we'll custom build a system to your specifications. Feature for feature, no one gives you more than ZEOS. At any price, anywhere. *It is the biggest bang for your buck!*

AWARD-WINNING SERVICE

We're the only company to win *PC Magazine's* Readers' Choice for Service & Reliability —for both desktops and notebooks—*twice!*

SERVICE & RELIABILITY · PC MAGAZINE · READERS' CHOICE

TOLL-FREE SUPPORT, WARRANTIES & GUARANTEES.

We're here for you 24 hours a day, 365 days a year, and always a toll-free call away. All ZEOS systems come with a One Year Limited Warranty, Express Parts Replacement Policy and a 30-Day Money-Back Guarantee.

Fax Orders: 612-633-1325, Government: 800-245-2449, TDD Orders: 800-228-5389, Outside U.S. and Canada: 612-633-6131. MasterCard, VISA, Am Exp, Discover, Z-Card,™ COD and Leasing programs. Open 24 Hours a Day, 365 Days a Year!

CALL NOW TOLL FREE
800-554-5218
24 HOURS A DAY

ZEOS INTERNATIONAL LTD.

Purchase orders are subject to approval. Business lessing programs available. Lease prices based on a 36-month lease. $0 purchase option. All prices, specifications and availability are subject to change without notice; call to confirm these and warranty details. Prices do not include shipping. All products and company names are trademarks or registered trademarks of their respective holders. ZEOS is a registered trademark. Z-Card and Computers Now are registered servicemarks of ZEOS International Ltd. 1204 Industrial Blvd. Minneapolis, MN 55413 USA. ZEOS is a publicly traded company (NASDAQ symbol ZEOS). LTR.AD.PCL.FEB.

Circle 265 on reader service card.

The ZEOS® Freestyle™ Notebook.

PACKAGE 1

386SL Freestyle: $1295
486SL Freestyle: $1695
- 2MB RAM (386SL); 4MB RAM (486 SL)
- 80MB IDE hard drive
- MS-DOS 6

PACKAGE 2

386SL Freestyle: $1795
486SL Freestyle: $1995
- 6MB RAM (386 SL); 4MB RAM (486 SL)
- 120MB IDE hard drive
- Custom nylon carrying case
- MS-DOS 6
- Microsoft Windows 3.1

PACKAGE 3

386SL Freestyle: $2295
486SL Freestyle: $2495
- 10MB RAM (386 SL); 8MB RAM (486 SL)
- 180MB IDE hard drive
- Internal 2400 bps V.42 bis modem with 9600 bps send/receive fax
- Custom leather carrying case
- Extra battery
- External charging stand
- MS-DOS 6
- Windows 3.1

FULL DESKTOP POWER YOU CAN TAKE ANYWHERE!

What do our customers want in a notebook? Not only great looks, you said, but also great power. Lightweight too, like five pounds and change. And with built-in accessories that make it the ultimate in portable power.

EPA POLLUTION PREVENTER

All ZEOS Notebooks have earned the EPA Energy Star logo for their energy-saving capability.

The ZEOS Freestyle is the direct result of discussions with our customers. For the most power, now you can choose from either a 386SL or 486SL Intel processor. We've included such features as a built-in mouse key, floppy drive and soft carrying handle. And at only 5.6 pounds, you'll want to take it with you whenever you travel!

The Freestyle's perfect for frequent flyers. Because the screen floats on a smaller footprint than a normally hinged screen, you can use it without fear of the person in front of you cranking their seat back and doing a "screen crunch" on your system. And check out that great tilt and swivel display. It lets you adjust the screen to the perfect viewing angle. It's one of the few notebooks that can truly be used while sitting in your lap!

Standard with every ZEOS Freestyle:

- 25MHz 80386SL or 80486SL Intel microprocessor.
- 386SL: 64K SRAM system cache; 486SL: 8K internal system cache.
- RAM expandable to 20MB (486SL) or 10MB (386SL).
- IDE hard drive expandable to 180MB.
- 256K (386SL) version or 512K (486SL version) video RAM.
- Internal 3.5" 1.44MB floppy drive.
- Serial, parallel, video and PS/2 ports.
- Supports an external SVGA color monitor with simultaneous display capability.
- 486SL version includes 3.3v technology for added battery life, built-in math coprocessor.
- Replaceable and rechargeable NiCad battery.
- 640 x 480 VGA backlit LCD display, 9.5" diagonal, up to 64 shades of gray.
- Unique tilt and swivel display.
- 81-key keyboard with built-in mouse key "inverted T" cursor keys and dedicated Home, PgUp, PgDn, and End keys.
- AC adapter with full range from AC 110-240V to DC.
- Power-saving features.
- FCC Certified Class B.
- 24-Hour Toll-Free Technical Support, 30-Day Money-Back Guarantee, Complete ZEOS Customer Satisfaction Package.

Purchase orders are subject to approval. Business leasing programs available. All prices, specifications and availability are subject to change without notice: call to confirm these and warranty details. Prices do not include shipping. The Energy Star emblem does not represent EPA endorsement of any product or service. All products and company names are

The ZEOS® Contenda® Subnotebook.

PACKAGE 1

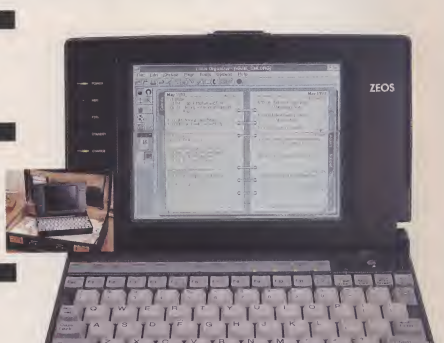
386SL Contenda: $1195
486SL Contenda: $1495
- 2MB RAM (386SL); 4MB RAM (486SL)
- 80MB IDE hard drive

PACKAGE 2

386SL Contenda: $1495
486SL Contenda: $1795
- 4MB RAM
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- MS-DOS 6, Windows 3.1, Lotus Organizer

PACKAGE 3

386SL Contenda: $1795
486SL Contenda: $2195
- 4MB RAM (386 SL); 8MB RAM (486 SL)
- 80MB IDE hard drive
- External 3.5" floppy disk drive
- Custom leather carrying case
- Extra battery
- Internal 96/48/24 send/receive fax modem
- MS-DOS 6, Windows 3.1, Lotus Organizer



Standard with every ZEOS Contenda:
- 25MHz 80386SL or 80486SL Intel CPU
- RAM expandable to 8MB for 486SL, 10MB for 386SL.
- IDE hard drive.
- Display: 640 x 480 VGA backlit, .23 dot pitch, Sharp 7.4" diagonal, up to 64 shades of gray.
- 256K (386SL version) or 512K (486SL version) video RAM.
- 486SL version includes 3.3v technology for added battery life, PI local bus for Windows acceleration, high-speed floppy drive controller, built-in math coprocessor.
- Supports simultaneous display with an external SVGA color monitor.
- Replaceable and rechargeable NiMH battery.
- 50-key keyboard with embedded numeric keypad and easy-to-use built-in trackball.
- Serial, parallel and video ports, plus ports for optional internal fax modem and external floppy drive.
- Fully-featured power management.
- 9.7" x 6.1"; 3.9 lbs.
- FCC Certified Class B.
- 24-Hour Toll-Free Technical Support, 30-Day Money-Back Guarantee. Complete ZEOS Customer Satisfaction Package.

SOLID PROOF THAT GREAT THINGS COME IN SMALL PACKAGES.

Smaller than a notebook. Lighter than a hard cover novel. The ZEOS Contenda subnotebook is proof that great things come in small packages! We start with a smart Intel SL processor—your choice of either a 386SL-25 or new 486SL-25. You'll find that the Contenda's processor extends your battery life significantly—because it's intelligent enough to power-down the memory, disks, modem and more when they're not in use.

intel inside

What's more, the Contenda's features make it a pleasure to use. Features such as a high-resolution backlit screen that's crisp and vibrant. A built-in trackball so you won't have to tote a mouse around. And with a standard 80MB hard drive, memory up to 10MB and weight of less than four pounds, it's one powerful, portable Windows workhorse!

CALL NOW TOLL FREE
800-554-5218

Fax Orders: 612-638-1325. Government: 800-245-2449. Hearing Impaired (TDD): 800-228-3389. Outside U.S. and Canada: 612-633-6131. Purchase Orders, MasterCard, VISA, Discover, Am Ex, Z-Card, C.O.D and affordable leasing programs. Open 24 Hours a Day, 365 Days a Year!

ZEOS INTERNATIONAL LTD.

trademarks or registered trademarks of their respective holders. ZEOS and Contenda are registered trademarks. ZCard is a registered servicemark. Prestige is a trademark of ZEOS International, Ltd. © 1993 ZEOS International, Ltd. 1301 Industrial Blvd. Minneapolis, MN 55413 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS). PRINT/PCC-1993

Circle 216 on reader service card.

THE NOMIN

In next month's issue, we'll announce the industry's elite—the winners of *PC/Computing*'s 1993 Most Valuable Product Awards.

Our MVP deliberations were a knock-down-drag-out fight this year, as the personal computer industry roared, writhed, and—as always—remade itself. Prices plummeted, CDs spun, and computers talked back.

Systems

Desktop Systems*
ALR Evolution V
Dell Dimension XPS 466V
Gateway P5-60

Entry-Level Desktop Systems
AST Bravo LP Green
Gateway 4DX2-66V
IBM ValuePoint

Notebooks and Portable PCs*
IBM ThinkPad 750C
NEC UltraLite Versa 33C
Texas Instruments TravelMate 4000E WinDX2/50

Subnotebooks*
Hewlett-Packard OmniBook
IBM ThinkPad 500

File Servers
Compaq ProLiant 2000 Pentium
Hewlett-Packard NetServer 5/60 LM Pentium
NetFrame NF450C/S

**Additional finalists under nondisclosure.*

Peripherals

Monitors
Nanao FlexScan F560iW
Nanao FlexScan F760iW
NEC MultiSync 5FGp

Video Adapters
Matrox MGA Impression
Number Nine GXE
SuperMac Thunder/24

Printers
Hewlett-Packard LaserJet 4L
Hewlett-Packard LaserJet 4Si MX
Lexmark International IBM LaserPrinter 4039 16L

Color Printers
Canon BJC-600
Hewlett-Packard DeskJet 1200C
Tektronix Phaser 200i
QMS ColorScript Laser 1000

Storage Devices
Maxtor MXL-105-1li
NEC MultiSpin 3XE CD-ROM
Seagate Technology Barracuda 2

Input Devices
Logitech MouseMan Cordless
Nisca Niscan Page
Pinnacle Paperless 1

Communications And Networks

Communications Hardware
Apple Newton
Intel SatisFaxtion
Megahertz 14,400 PCMCIA Data/Fax Modem with X Jack

Communications Software
Delrina WinFax Pro for Networks
Symantec Norton pcAnywhere 1.0 for Windows
Traveling Software CommWorks for Windows

Network Software
Microsoft Windows NT Advanced Server
Novell NetWare 4.0
WordPerfect Office

Network Hardware
Intel StorageExpress
Synernetics LANplex 6012
Telebit NetBlazer PN

EES ARE...

Below is a list of this year's products in each major category that we believe mattered most to you and your business. Our editors spent months researching these nominees, and identified them as the most innovative, usable, technologically advanced products on the market.

But only one product can be best in its class. Don't miss the winners.

System Software

Application Development Software
Borland C++ 4.0
Microsoft Visual Basic 3.0
Microsoft Visual C++

Operating Systems And Environments
IBM OS/2 2.1
Microsoft Windows NT 3.1
Novell DOS 7.0

System Utilities
Central Point Software PC Tools for Windows 1.0
Hewlett-Packard Dashboard 2.0 for Windows
Symantec Norton Desktop 3.0 for Windows

Innovation

Software Innovation
Lotus Smart Suite 2.1
Microsoft OLE 2.0
SunSelect Wabi

Hardware Innovation
Cyrix Cx486SRx^2
Intel Energy Star PC
Intel Pentium Processor

Multimedia and Graphics

Multimedia Software
Adobe Premiere
IBM OS/2 2.1 Multimedia Extensions
Macromedia Authorware Professional 2.0.1

Multimedia Hardware
Pinnacle Micro RCD-202 PC
Pioneer CD-ROM Jukebox DRM-604X
Sigma Designs ReelMagic

Painting and Drawing Software
Adobe Photoshop 2.5
Corel CorelDraw 4.0
Micrografx Picture Publisher 4.0
Virtus Walkthrough for Windows 1.1.1

Entertainment and Education Software
Broderbund Arthur's Teacher Trouble
Microsoft Musical Instruments 1.0
Virgin Games The 7th Guest

Business Applications

Databases
Lotus Approach 2.1
Borland Paradox 4.5 for DOS
Borland Paradox 4.5 for Windows, Workgroup Edition

Spreadsheets
Borland Quattro Pro 5.0 for Windows, Workgroup Edition
Lotus 1-2-3 4.0 for Windows
Microsoft Excel 5.0 for Windows

Word Processors
Microsoft Word 6.0 for Windows
WordPerfect 6.0 for DOS
WordPerfect 6.0 for Windows

Financial and Accounting Software
Intuit QuickBooks 2.0 for Windows
Intuit Quicken 3.0 for Windows
Reality Smart Investor Network 2.0

Business Utilities
Arabesque Ecco Professional 1.1
Folio Views 3.0
Jensen-Jones Commence 2.0
Watermark Discovery Edition

Presentation Graphics
Asymetrix Compel 1.0a
Micrografx Charisma 4.0
Software Publishing Harvard Graphics 2.0 for Windows
WordPerfect Presentations 2.0

Desktop Publishing
Frame Technology FrameMaker 4.0
Microsoft Publisher 2.0
QuarkXPress 3.2 for Windows

HiJaak® PRO

Graphics transportation to all your applications

Use virtually *any* image *any* where

Accurate Graphics Conversion & Viewing

- Supports 70 + graphics formats, such as Kodak PhotoCD, JPEG, & virtually any TIFF
- Cross-platform conversions to & from Macintosh, SUN, Amiga, & mainframe formats
- View images & "thumbnails" at a glance

Seamless Integration With Your Applications

- Transparently import 70 + graphics formats into:
  - PageMaker
  - FreeHand
  - Persuasion
  - Word for Windows
  - PowerPoint
  - AmiPro
  - WordPerfect for Windows
- Use OLE with other applications

Advanced Image Processing

- Rotate, crop, smooth "jaggies"
- Adjust contrast/brightness, reduce colors

Easy Screen Capture

- Capture all or part of Windows screens
- Capture full DOS text & graphics screens

Time-Saving Image Management

- Create "thumbnails" of images and organize in nested folders
- Update "thumbnails" automatically during idle time

$89

INCLUDES FREE GROUND SHIPPING

Free Clip Art!

HiJaak PRO

Use virtually *any* image *any* where

Requires Windows 3.1

Free Tech Support!

Inset Systems

71 Commerce Drive, Brookfield CT 06804-3405

CALL FOR FREE CATALOGUE

DUSTIN DISCOUNT SOFTWARE

Plain Wrap Prices, Black Tie Service.

Call Toll Free to Order

1-800-274-6611

FAX your order 24-hours

1-818-884-5310

20969 Ventura Blvd., Woodland Hills, CA 91364 818-710-9174

Prices subject to change without notice.

All product names are trademarks of their respective companies. ClipArt images are from ImageFine's PicturePak. HiJaak is a registered trademark of Inset Systems Inc. © copyright Inset Systems Inc. 1993 All rights reserved

Circle 126 on reader service card.

The Final Word on Word Processors

Megalomaniacal managers, assaults on OS/2 hype, and Penn's problem clustering.

Writing and the Real World

Your August cover claims that readers will be shocked to learn that Lotus's Ami Pro stands head and shoulders above other word processors ("War of the Words," page 124). The only thing that shocks Ami Pro users is that this isn't common knowledge.

DAVID G. IMBER
NEW YORK, NEW YORK

Your "War of the Words" comparison was unpersuasive.

Instead of specific, concrete information, you presented prejudices and judgments. Why not let us form our own opinions? Give us the information and the raw data, and let us come to our own conclusions. I resent it when somebody tells me what I am supposed to think.

I find the same bias in your WordPerfect review ("WordPerfect 6.0," page 108). Ron White presumes that "staff is clamoring for the cool buttons, slick graphics, and usability improvements found in Windows programs." I can't imagine anybody on Earth "clamoring" for "cool buttons."

CHARLES OBLER
FARMVILLE, VIRGINIA

Gee, Mr. Obler, we guess you're right and Windows users everywhere are wrong.
—The editors

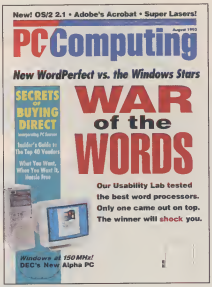
Once again the Windows bias raises its ugly head in your word processing usability tests.

Sure, Microsoft Word for Windows, Lotus Ami Pro, and WordPerfect for Windows are great—if you use Windows. But what about DOS? WordPerfect 6.0 is far from perfect, but in your own words "it jumps through hoops like no DOS product we've ever seen." Maybe you really need two standards of usability. We seem to be talking about apples and oranges.

GREG CARRELL
BETHANY, MISSOURI

In the real world, word processors are used to type letters and reports from left to right, top to bottom. It is a craft to produce consistently fine results in a quick and affordable manner.

DOS is for craftspeople, and Windows



is for those who have the time, spare hardware power, and inclination to seek perfection. WordPerfect 6.0 is a pragmatic solution to the real-world problems of cost-conscious users.

JON C. COATES
NOVA SCOTIA, CANADA

I'm writing in support of all of us "technonerds" who run their computers with GUI operating systems. Many people think that the computer revolution ended with DOS and that folks are crazy to use anything else. And many people won't fly because if God had intended us to fly, he would have given us wings.

Under DOS, I tried to master Lotus and WordPerfect programs for hours, with nothing to show for it but frustration. When I switched to Windows, I accomplished things before I knew it. If being able to use my computer makes me a technonerd, then so be it. If I had to depend on DOS versions of my current programs, my PC would be nothing more than an expensive boat anchor.

STEVEN ADAMS
JONESBORO, GEORGIA

I regard your reference to Rush Limbaugh in the "War of the Words" to be of poor journalistic judgment.

It is not only an up-front attack on the man himself but an obvious bias and attempt to cram your political agenda down the throats of your readers. You are correct in saying that you shouldn't bring up sex, politics, and religion in polite company, so why did you? Rush Limbaugh listeners are not a bunch of fanatics, as you suggest. I subscribe to *PC/Computing* to keep current about the computer industry and I do not expect to be personally insulted and subjected to your anti-conservative bias in an article about word processing. Stick to the facts and stop injecting your left-wing rhetoric into technical articles.

MATT BROWN
CHESTERFIELD, MISSOURI

Your August cover story was underwhelming. It really amazes me that you could boldly proclaim that the winner would shock readers when the winner is

actually Ami Pro. Ever since it was released, Ami Pro 3.0 has been winning top honors. So where's the shock?

FRANK CALLOWAY
LOVELAND, COLORADO

WordPerfect 6.0 is like an automotive lemon from Detroit—all glitz and chrome, but there's nothing under the hood. If I want games, I'll buy Nintendo; if I want buttons and ribbons, I'll go to Woolworth's. When it takes 30 to 45 minutes to process and print a 1-page document, that's not progress. In the company's efforts to include everything, it forgot efficiency and productivity. Oh well, it's back to WordPerfect 5.1.

ROBERT J. BERTOLINI
PAWTUCKET, RHODE ISLAND

Lotus Takes the Lead

Ed Bott wrote in one page what I have been telling my friends and co-workers for years ("Who's Making the Best Windows Interfaces? Micro-Who? I Say Lotus," August, page 20). As a Lotus advocate since the early releases of 1-2-3, I knew that a company with the ingenuity to develop such a revolutionary computer application was worth watching.

JAMES D. HESS
COPPERAS COVE, TEXAS

Yes, Ed Bott, I think you're crazy. Crazy for not giving Lotus's Ami Pro enough acclaim for being a superior word processor, and crazy for not mentioning Lotus Organizer, the most user-friendly personal information manager available today. And I'm clearly crazy as well, for ragging on someone who has the courage to proclaim that Lotus is building the best Windows applications in the business.

LENNY SITA
PARADISE, CALIFORNIA

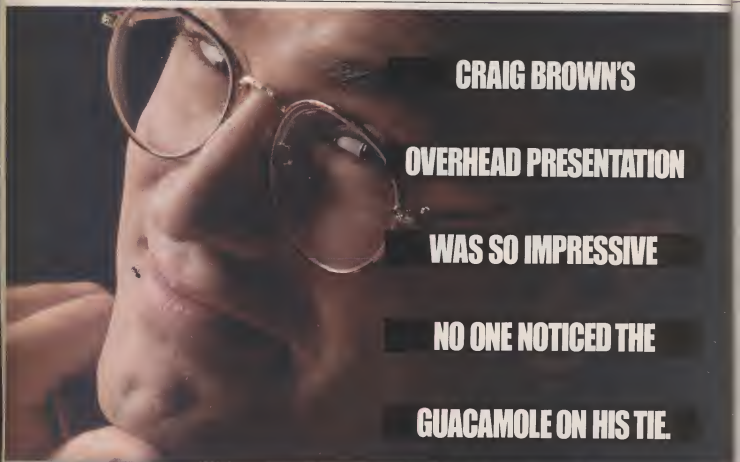
I don't think you're crazy, Ed Bott, just a little naive to think that Lotus's recent moves will go unanswered and that the Cambridge company has unseated Microsoft. I agree that Lotus is doing a lot of things right, but remember: It has had a few flops to learn from. I'm glad Lotus has improved, but if consistency counts, Microsoft wins hands down.

STEPHEN PEELE
SWAMPSCOTT, MASSACHUSETTS

Who's the Boss?

John C. Dvorak's August column, "The Servant Becomes the Master: The Computer Is Killing Us" (page 90), will probably bring condemnations from countless managers for daring to criticize the technology that helps make them more "effective," especially in companies where the measurement is the ability to exact more and more work from employees and fire those who can't take the stress.

Having worked in the U.S. Postal Service for ten years, I have seen incredible advances in the technology of sorting mail but a continuing regression in the methods of managing the people



who use the technology. Instead of making work more interesting and more challenging and providing workers with a greater sense of accomplishment, the technology leads to a hostile environment that forces highly paid union workers to leave so that they can be replaced with nonunion employees who can be paid less, denied benefits, and fired if they complain.

VINCENT F. SAFUTO
LAKE WORTH, FLORIDA

While I hesitate to agree that "The Computer Is Killing Us," John C. Dvorak's general point should be taken to heart. However, he is not quite accurate to claim that no one is paying attention to the effects of items such as the paging device that tether employees to the workplace.

The psychological effects and human implications of the PC's ascendancy in the workplace are becoming the principal focus of today's organizational psychologists. The problem is that their work is disregarded by those at the top of the corporate power structure.

BRIAN DONOHUE
BROOKLYN, NEW YORK

The Drawbacks of Clustering

John C. Dvorak is correct in arguing that computers are negatively affecting the work environment, but he misses the point in his indictment of the PC itself, its users, and its developers. The fault lies with the megalomaniacal manager who misuses the information gleaned from that technology.

Penn Jillette describes a perfect example of this phenomenon in his column in the same issue ("Get Involved! Send Me Your ASCII," page 356). Jillette writes about a dinner with *PC/Computing* staff at which these desperately-in-need-of-a-life editors express concern about how well his column is received—as measured by how reader-survey results "cluster" on a computer-generated graph.

Jillette's humorous column in a truly business-oriented publication provides a respite analogous to the one Dvorak prescribes for workers. A reader or worker can process only so much before a break is required. Those editors and managers who use computers to monitor and manipulate production and performance are modern-day slave drivers. The computer is merely their new tool.

Hats off to Jillette for showing us who has a sense of humor and who needs one, and thanks to Dvorak for showing us the big picture.

JOHN DOWNIE
WARWICK, RHODE ISLAND

I was surprised that *PC/Computing*'s readers didn't rate Penn Jillette's column very well. (Perhaps *well* isn't a good word to use here; maybe *consistently high* is better.) Hell, Penn's column is the main reason I subscribed to *PC/Computing* in the first place. That's either a commendation for Jillette or a

Incredible overheads and prints that rivet your audience's attention. Made easily and affordably. Right at your desktop.

The KODAK COLOR*EASE* PS Printer. Continuous-tone transparencies and prints. Superb resolution. Plus *UltraColor* Software from Kodak that gives you great color the first time, and every time. True Adobe PostScript® Level 2. Fully compatible with your MACINTOSH Computer or WINDOWS Software. With simultaneous printing and processing to maximize your productivity. No other printer can do so much, so fast.

What you eat for lunch is your business. Helping you look your best in your presentation is ours. Give yourself a competitive edge with the KODAK COLOR*EASE* PS Printer. Because nobody knows color like Kodak.

Call 1-800-344-0006 in U.S. or 1-800-465-6325 in Canada for a sample transparency and dealer information.

PostScript is a trademark of Adobe Systems, Inc., registered in the U.S. and other countries. Kodak and ColorEase are trademarks. © Eastman Kodak Company, 1993

Circle 247 on reader service card.

condemnation of my taste—you decide.

I hope his points begin clustering better for him.

DAVID HENRY
LEADWOOD, MISSOURI

Penn Jillette's columns are an abomination. Does anyone, even he, know what they're about? Unless he is a close relative or he's blackmailing you for something, give him a pink slip.

GLENN R. STOUTT, JR.
LOUISVILLE, KENTUCKY

OK, you found out: Penn really is a close relative. —*The editors*

OS/2's 15 Minutes of Fame

You did it again! "OS/2: It's Top Technology, but Where Are the Apps?" (New! August, page 36) is more evidence that *PC/Computing* has become nothing more than a mouthpiece for Microsoft's Ministry of Truth.

In a megapage review of Windows NT in July, you weren't concerned with NT's 70MB storage requirement, yet OS/2's 18MB to 31MB requirement is a big problem. As far as the availability of apps goes, there are Lotus 1-2-3, Freelance, and Ami Pro, as well as WordPerfect and DeScribe word processors, CorelDraw, Norton Commander, screen savers, games, and more. I suppose there just wasn't room to list them all in a 4-page report.

SEAN COADY
NORTH PLATTE, NEBRASKA

OS/2, like many products from IBM, is lackluster and underpowered. It falls far short of what I understand Windows NT will be capable of handling. OS/2 is still a memory hog, has no built-in networking support, and, in my opinion, is difficult to use. Windows NT is also too hard on hard disk and memory resources, but it certainly has many more features.

Many of us just don't like OS/2 or other GUIs and can't afford the hardware necessary to run them. DOS is an excellent system. I'd like to see a 32-bit version of DOS or another command-line operating system for the new Pentiums.

GEOFF STANFORD
LONG BEACH, CALIFORNIA

You people are really getting on my nerves. OS/2 does not cost a fortune or require a megamachine. It is not some daunting, esoteric beast. Do your readers a favor, and get off the Microsoft bandwagon. Windows is about as safe as pedestrians jaywalking in New York City with their eyes closed.

GARY M. ROBERTS
BENSALEM, PENNSYLVANIA

Thanks for Tracey Capen's article about OS/2. There's no reason people can't move to OS/2 today. It runs DOS and Windows programs, thousands of OS/2 apps are available commercially

Skull

We all have a strong mental *impulse to work too hard for too long at our computers and that could lead to injury, so give yourself the* warm-ups, breaks and stretches

© 1993 Ergodyne

and as shareware, and OS/2 protects misbehaved programs from each other. It is truly powerful.

JOHN BALES
MOUNT AIRY, MARYLAND

Your brief OS/2 review didn't mention some of OS/2's best features: reliable background file transfers, even when accessing the disk or crunching numbers; extremely fast disk access; background floppy-disk formatting; built-in SCSI support; a fast and bulletproof background print spooler; a top-notch disk cache; and superb memory management for DOS applications.

MICHAEL PRAGER
CORAL GABLES, FLORIDA

I was pleased by your coverage of IBM's OS/2 2.1, but I think Tracey Capen could have spent a little more time discovering the latest version of this operating system before writing his article.

He wrongly stated that you must run OS/2's Migrate utility to add Windows applications to the desktop. You can easily add programs—as well as data objects, folders, and printers—by simply dragging the appropriate template from the Template folder on your desktop. Then enter the program's path and filename (or use OS/2's built-in Find utility), and OS/2 determines if it is a DOS, Windows, or OS/2 application. If you overlook the Template folder, then you miss the whole point of the Workplace Shell and its deeply rooted object-oriented design.

JAMES HIMMELMAN
HICKSVILLE, NEW YORK

A 'Slick' Ad

I couldn't help notice Logitech's ad for its EasyTouch scanner on page 141 of your September issue. Whoever's running Logitech's ad campaign is obviously on the edge. Between the "Feels Good, Feels Better" ads and this EasyTouch ad featuring President Clinton, Logitech is to be complimented on its sheer audacity.

The Clinton-scanner ad is a stroke of pure, sick genius. It's ironic that not only is a company that makes computer mice and scanners calling him "Slick" (or did I miss the point?), but it also chose a picture that represents both the procedure required to install their product and what Mr. Clinton is doing to the American public.

LLOYD HANSON
VIA COMPUSERVE

The ABCs of IRQs

Thank you for Sally Neuman's article on IRQs ("Got Hardware Problems? We've Got Answers," August, page 180). Unfortunately, the sample Microsoft Diagnostics log in the "Windows into Your Hardware" substory (page 189) was difficult to interpret. Are IRQs 10, 11, 12, and 15 available as selections for a new peripheral board? They are described as reserved and

you need to be as productive as possible with our new stretch software.

Software

ergodyne WorkSmart

software for your hardware 1-800-323-0052

Circle 160 on reader service card.

FIRE-UP Your FONTS...

With The Hottest Font Styling And Design Tool On Disk!

Effects SPECIALIST For Windows

The Premier Font Styling and Design Program

Increase Creativity The Easy Way... Maximize the Speed and Power Of Your Graphic Design.

Powerful, Versatile, Creative!

Quickly and easily transform ordinary fonts and graphic shapes into spectacular display type and unique graphic effects.

Create distinctive and dynamic artwork for logos, headlines, mastheads, flyers, presentations, stationery, slides, brochures, newsletters, posters, banners and an endless variety of exciting graphic applications.

Hot Effects

ExactWYSIWYG

- Unparalleled ease of use, speed and overall performance on any CPU/display
- Superb PostScript™ output to any Windows-supported printer
- 24-bit color support
- Bezier control of fonts and paths
- Apply effects to any drawn paths
- Bitmap and font outline control; stretch, distort, rotate, skew, scale, invert, mirror image, plus!
- Incorporates OptiScript™ – the only PC-based implementation of true PostScript™ display
- ExactWYSIWYG™ – true PostScript™ display on screen

Font DESIGN & STYLING

ONLY $109 Retail Value $199.95

Another Software Innovation From POSTCRAFT INTERNATIONAL INC. The Creative Support Software Specialists™

FREE WITH PURCHASE! 5 Monotype fonts & 26 PolyType graphics in font format.

FREE GROUND SHIPPING

DUSTIN DISCOUNT SOFTWARE

Toll Free in USA Mon thru Fri 6AM to 5PM, Sat 10AM to 2PM PST 1-800-274-6611

24-hour FAX 1-818-884-5310

Plain Wrap Prices, Black Tie Service.

20969 Ventura Blvd., Ste 13, Woodland Hills, CA 91364

Prices subject to change without notice

Circle 124 on reader service card.

Letters

handled by BIOS. Is IRQ 3 available? It is described as using "COM2: COM4:" and is not detected.

MICHAEL J. FULLER
WALLINGFORD, CONNECTICUT

The IRQs shown as reserved in the sample MSD report are indeed available on this system. IRQ 3 is the default setting for both the COM2: and COM4: ports in this report, but only COM2: was physically present in the BIOS. In a typical IBM-compatible ISA machine, COM1: and COM3: share IRQ 4, and COM2: and COM4: share IRQ 3. If you fully inventory your system using the configuration work sheet on page 183, you'll have a much better idea of which IRQs and ports are physically in use or available in your own system, and the detail in the MEM and MSD report examples will be much clearer. —Sally Newman

I applaud Sally Neuman's article on hardware interrupts and your insight in publishing it. This is the type of article I will save in a binder for future reference.

EMMETT DULANEY
ANDERSON, INDIANA

Direct to You

Thanks for the great article on direct-channel marketing ("Why Buy Direct?" August, page 245) and for incorporating more of *PC Sources* into your magazine. Finally, I can subscribe to only one magazine for all my computing needs.

PHILIP C. WEAVER
ABILENE, TEXAS

Your "Direct Top 40" suggests that it would reveal how 40 top vendors "stack up against one another," but I was left wondering how to differentiate the companies. On your scale of 0 to 5 (5 being best), 5 companies received the 5-star rating and 30 companies received a 4-star rating. I have never seen 88 percent of the participants in a contest tie for first or second place.

MARC DEVREAUX
PETERBOROUGH, CANADA

Unfortunately, not every mail-order company has gotten the message: Treat customers right—even if it costs a bit more—and you'll prosper in the long run. Case in point: In July, I ordered a 486 from a direct-mail company. Nine days later (just before the scheduled ship date), the salesperson called to give me "bad news": Fork over another $150 or my order would be canceled. Apparently, memory prices skyrocketed because of a fire in a Japanese factory that makes epoxy resin for chips.

I was outraged. I had perhaps naively assumed that a contract existed once the company agreed to sell me a system at a particular price. I canceled my order and placed another with a competitor that stuck to its published prices. This competitor recognizes that fair treatment of customers is in the company's own best interests. While I paid a premium for peace of mind, it's well worth it.

ZEV WALDMAN
WASHINGTON, D.C.

Your direct-mail article came too late for me. Last October I purchased a computer system from PC Brand, which was one of your Top 40 vendors. After too many problems to mention, I'm sending the system back for a refund.

Articles like your "Direct Top 40" lead people to think they can trust the companies mentioned. While I'm not blaming you for my problems with PC Brand, I felt compelled to let you know how this company, regardless of its many rave reviews, dealt with me.

SANDRA F. GILCHRIST
ALLEGAN, MICHIGAN

Corrections

In the October "PC/C Update" (page 101) we gave an incorrect price for the upgrade to QEMM Version 7. The correct upgrade price is $35.

In the September "Best Software Buys" (page 102) we mistakenly reported on which mail-order house had the best prices for Windows 3.1 and Lotus 1-2-3 3.4. In both cases, the best prices could be found at PC Zone (800-252-0386).

Mail your thoughts to Letters, PC/Computing, 950 Tower Lane, 19th Floor, Foster City, CA 94404; fax us at (415) 578-7029; or contact us via MCI Mail at PCC Editorial or via PC/Contact, our online forum. Letters must be signed and must include a daytime phone number. All letters become the property of PC/Computing *and will be edited for length and clarity.*

"PING-PONG mania is sweeping the nation. Sales are bouncing through the roof. And my competition is swatting air. I'm faced with insurmountable opportunity but with ACCPAC as my partner, I can't miss."

Name: Johnny "The Big Pong" Mannix
Title: Owner/President/Spokesperson
Company: The PING-PONG Institute
Salary: $125,000/Year
Annual Sales: $8,650,000
5-Year Average Annual Growth: 85%
Software: ACCPAC® Plus Accounting™
Favorite Module: "Accounts Receivable, of course."

ACCPAC Plus Accounting Software.

More accountants recommend it.
More businesses use it.
More people prefer it.
We'll show you why.
Call 1-800-225-5224, Dept. 30006 for a free Demo Disk of the leading accounting software in North America.
Call right now.
The ball is in your court.

Circle 213 on reader service card.

COMPUTER® ASSOCIATES
Software superior by design.

© Computer Associates International, Inc., Islandia, NY 11788-7000
PING-PONG is a registered trademark of Indian Industries, Inc.

You just saved a bundle on PCs. Now, who's going to save you from the people who have to use them?

Low price alone doesn't equal value. A PC that can't do what you need is a PC you just can't afford. Fortunately, AST's Bravo family now includes everything from notebooks to minitowers. All packed with features and power. Consider the low-profile Bravo LP, a powerful yet energy-efficient desktop with EPA EnergyStar approval. Also EPA-approved is the Bravo MT, an upgradable, enormously expandable minitower. To get excellent Windows performance at a low price, check out the Bravo LC with local bus graphics. And the Bravo NB gives you a powerful, advanced notebook you can actually afford. So before you choose, call us at 800-876-4AST. Your controller will like the price. Everyone else will like the computers.

AST. COMPUTER

The Product Of Our Obsession.

© 1993 AST Research, Inc. All rights reserved. AST, AST logo are registered trademarks of AST Research, Inc. The Intel Inside logo is a registered trademark, and Pentium and OverDrive are tradema

BRAVO FAMILY

DESKTOPS AND MINITOWER

*Local bus graphics. Up to 256KB cache. Maximum 64MB RAM. Technical support 24 hours a day, seven days a week. One-year on-site, two-year carry-in coverage for hard-drive models.**

BRAVO LP

*Low-profile chassis. EnergyStar certified. Two ISA slots, three drive bays. Intel 486SX/25, 486DX/33 or 486DX2/66 microprocessor; upgradable to Pentium™ OverDrive.™ Starting at under $1000***

BRAVO MT

*Minitower chassis. Six ISA slots, six drive bays. Intel 486DX/33 or 486DX2/66 microprocessor; upgradable to Pentium OverDrive. 200-watt power supply. Starting at $1300***

BRAVO LC

*Midsize chassis. Five drive bays, four 16-bit ISA slots. Intel 486SX/25, 486SX/33, 486DX/33, 486DX2/50 or 486DX2/66 microprocessor; upgradable to Pentium OverDrive. Starting at $900***

BRAVO NB

*Notebook with Intel 486SX/25 microprocessor and integrated trackball. 9.5" monochrome, dual-scan color or TFT color display. One PCMCIA Type III slot. 20MB RAM. One-year carry-in warranty. Starting at $1699***

Call for more information.

800-876-4AST

intel inside

of Intel Corporation. All other trademarks are the property of their respective owners. *Three-year carry-in warranty for non-hard-drive models. **Estimated U.S. sales price. Reseller pricing will vary.

New!

HIGH NOON IN THE PC/COMPUTING TEST LABS . . .

Showdown at the OS

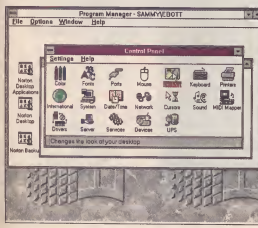
WINDOWS NT 3.1

Gee, Windows NT 3.1 looks like Windows. You won't find much of a face-lift on Windows NT, but the insides are completely different from Windows 3.1. Microsoft included networking and lots of productivity tools, and created an operating system that will take advantage of even the most advanced hardware.

Pros: no-brainer installation, bundled copies of Schedule+ and Microsoft Mail, and, when something goes wrong, the ability to resort to the last configuration that worked.

Cons: that aging Windows 3.1 interface and its current lack of applications.

Right now it's the envy of every power user. In a few years, as computers become more powerful, it will become the standard desktop operating system.



ARE YOU READING this article while waiting for your computer to run a database query or maybe a big download? You're not alone: Windows 3.1 and DOS aren't known for their ability to multitask. And that's just one area where they fall short, even on the fastest hardware available. Maybe it's time to consider a whole new operating system.

The battle for the high-end desktop—your desktop—is getting fierce. Microsoft's Windows NT 3.1 and IBM's venerable OS/2, now in Version 2.1, both want a piece of the action. These two operating systems offer preemptive multitasking (the ability to switch between programs quickly) and multithreading (the ability to switch between parts of a program quickly). Windows NT even offers multiprocessing.

How to Decide?

To determine which one you want on your high-end desktop, we subjected these two systems to compatibility, performance, and usability tests. But the winner isn't clear-cut. Which one you'll prefer depends on what you're used to. If you like the Windows 3.1 interface, go for Windows NT: It looks and feels like Windows 3.1 and runs its applications without a horrid performance hit. If you're coming from the DOS world, or don't like what you're getting in Windows 3.1, you'll probably find that OS/2 is a slicker operating system overall.

The first experience you have with any operating system is the installation process. True, you install only once (if you're lucky), but the installation speaks volumes about design and the thought that went into each product.

We upgraded a lightning-fast Dell Dimension XPS 466V from DOS 6.0 and Windows 3.1 to OS/2 and Windows NT, respectively. We ran both installations from CD-ROM, and each took about 25 minutes.

The Windows NT installation was far smoother and required far less user intervention and knowledge than OS/2's. Microsoft went out of its way to create an install program that shields users from the upgrading process. Bravo to the developers.

The OS/2 2.1 installation is a step up from 1.3's but requires a lot more baby-sitting. In particular, the process required that we pick which DOS and Windows apps we wanted to migrate to OS/2—a time-consuming process.

By contrast, we could have done the Windows NT installation in our sleep. Unlike OS/2, Windows NT figures out what hardware you have and automatically migrates Windows 3.1 apps. We barely had to intervene in NT's installation process.

Although Windows NT migrated many of our applications, it stumbled when it came across duplicate group names. For example, our Windows 3.1 system had a group called Applications that stored the applications we used most often. Windows NT also has a group called Applications and, rather than incorporate the items from our Applications group into its own, it blew our group away.

User Environment

After installation, we were confronted by the user interfaces. By now, you've probably heard oodles about NT's Windows 3.1-like interface and OS/2's Workplace Shell. If you haven't, here's the skinny: Windows NT looks like Windows 3.1; OS/2 doesn't.

OS/2's desktop is the Workplace Shell. One of its nicest features is that help is never more than a double-click away. You have your choice of a tutorial; help index; and a collection of "readme" files, glossaries, and command reference files. All the help

Corral: OS/2 vs. NT

facilities are well organized and well written.

You'll also appreciate OS/2's menu system, which combines pop-up menus with notebook-style menus. Use your right-mouse button to click on any item on the desktop, and you'll get a pop-up menu that lets you check and set various parameters.

Many pop-up menus lead to OS/2's notebook menus. Rather than forcing you to wade through endless pull-down menus and dialog boxes, OS/2's selection interface looks like a notebook, complete with tabbed pages. Simply put, the notebook is a better way to think about menus.

For its part, Windows NT is wearing the latest in Windows chic, which is a nice way to say that it looks like Windows 3.1. You'll find all your favorite program groups and programs. Microsoft didn't even improve the much-maligned File Manager. Installation is great—why couldn't Microsoft fix some of the interface weaknesses?

Windows NT includes some useful productivity tools, including Schedule+ and Microsoft Mail. But perhaps the greatest advance in Windows NT is the "last-known good configuration" option at boot. Put simply, if you mess up your system configuration and Windows NT won't start, reboot the computer and Windows NT gives you the option of going back to the last configuration that worked. Less great are some of the more frivolous modifications. For example, you can now change your cursor—just look in the control panel for the Cursors item. Our favorite was the banana that peels and eats itself repeatedly—the product, no doubt, of programmers with far too much time on their hands.

Compatibility

The greatest drawback of both OS/2 and Windows NT right now is the lack of widely used applications. That means you'll probably wind up running Windows 3.1 and DOS applications. The good news is that almost all of them work, although some, such as Delrina's WinFax Pro, need special drivers.

We tested many applications, including Borland's dBASE IV for DOS and Paradox for Windows, DataStorm's ProComm Plus for DOS, Software Ventures' Microphone Pro for Windows, WordPerfect for DOS, Lotus 1-2-3 for DOS, Microsoft's Excel for Windows and Word for Windows, Central Point's PC Tools for Windows, and Delrina's WinFax Pro.

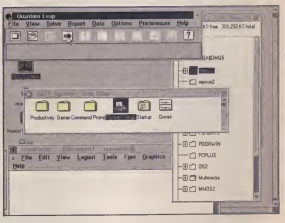
In general, almost everything worked perfectly. Both operating systems fell down, however, when it came to running the last two applications. It seems applications that take over the desktop and need special COM port drivers give these systems problems. Maybe in the next versions. . . .

The Need for Speed

If compatibility was the good news, nonnative application performance is the only so-so news. We had one of the fastest computers you can lay your hands on, and OS/2 and NT both felt reasonable. They were, however, noticeably slower at running native Windows 3.1 applications as a single task.

Our first tests stressed single-task performance: running one application at a time. Running DOS apps, you'll notice almost no difference between native DOS and OS/2 or Windows NT. When you switch over to Windows applications, however, you'll notice that the performance of both Windows NT and OS/2 drops relative to native Windows 3.1—by as much as 60 percent in some cases.

Our second test set stressed multitask



OS/2 2.1

If you've never touched a GUI before, you'll probably fall in love with OS/2 2.1. It's easy to use, attractive, and includes lots of online help. When you delve into its nuts and bolts, you'll find an object-oriented operating system with a threaded, multitasking kernel.

Pros: help everywhere, nice interface with pop-up and notebook-style menus, great multimedia support.

Cons: less-than-great performance running Windows 3.1 and DOS applications.

Hey, everybody: There is an alternative to Windows. Although OS/2 2.1 may never gain the popularity of Microsoft's operating system, it's good to know you have a choice.

(Continued on page 56)

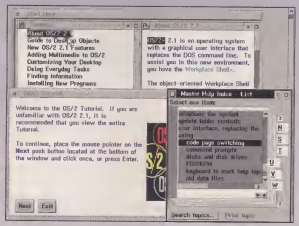
New!

A Guided Tour of OS/2 and NT

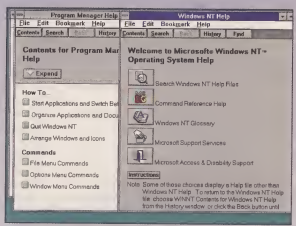
OS/2 2.1 and Windows NT 3.1 offer many of the same amenities, but they look different. Really, really different. We're talking night and day. Windows 3.1 users will feel right at home in Windows NT, with its pull-down menus and familiar groups of applications.

If you're used to most GUIs, including Macintosh and Unix interfaces, you'll probably find yourself a bit out of place in the OS/2 Workplace Shell at first. You need to know that you use both mouse buttons: the left for selecting items, the right for revealing pop-up menus and dragging items around the desktop. And when you minimize an application, it doesn't always form an icon on your desktop: It may just as easily move into the Minimized Window Viewer or disappear entirely.

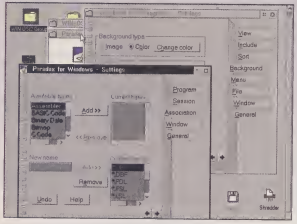
Follow us on our tour through these two operating systems.



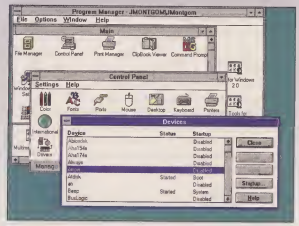
OS/2 neophytes will want to check out its help first thing after loading. And there's a lot of it to check out: a tutorial, an index, and various documentation files, to name a few.



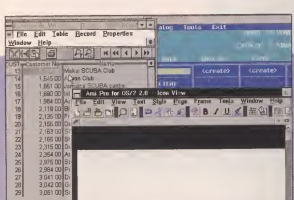
Windows NT's help system builds upon that in Windows 3.1—but not enough for our taste. The biggest advance is that Windows NT includes an easy-to-follow and informative tutorial.



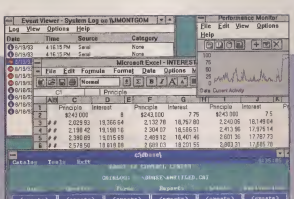
OS/2's menus are a blessing. The pop-up menus you access through the right-mouse button will lead you to these notebook-style menus that are remarkably easy to use.



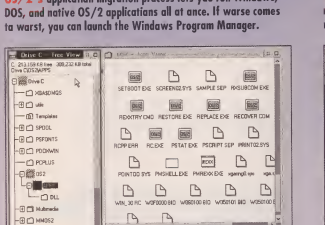
Windows NT's menu system—which exactly mimics that of Windows 3.1—isn't worth a look. You should check out the new functions in the Control Panel instead.



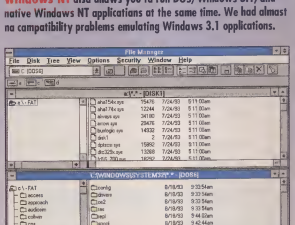
OS/2's application migration process lets you run Windows, DOS, and native OS/2 applications all at once. If worse comes to worst, you can launch the Windows Program Manager.



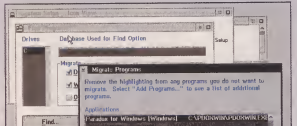
Windows NT also allows you to run DOS, Windows 3.1, and native Windows NT applications at the same time. We had almost no compatibility problems emulating Windows 3.1 applications.



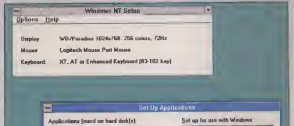
OS/2's Drive Manager beats Windows NT's. Why? You can drag and drop between it and OS/2 applications. OS/2 can also store files and folders directly on the desktop.



Windows NT's File Manager, or "File Mangler" as it's affectionately known, is one of the worst features of Windows 3.1, and it's made its way into Windows NT intact.



OS/2's migrating process is fairly simple, but not as transparent as we would like. Why can't OS/2 automatically migrate DOS and Windows applications when you launch them the first time?



Windows NT does a much better job with application migration, automating the process considerably. To Windows NT, migration really means bringing over settings such as file associations.

Showdown: OS/2 vs. NT, *from page 53*

performance, in which we started to download a file, then ran other tasks in the foreground and timed them. With Windows 3.1 applications, we saw results we expected: The true multitasking operating systems—OS/2 and Windows NT—achieved consistently higher performance than Windows 3.1. *Note:* Because we had Windows NT set to make foreground tasks run as fast as possible, it sometimes preempted the download, meaning the foreground task ran faster, but the background task stopped.

The Bottom Line

Both operating systems offer great advantages over Windows 3.1, but at a price: You need powerful 486/33-class hardware before they feel responsive. Another drawback is that you'll probably find few of the applications you're used to running on either operating system—at least right now.

Microsoft and IBM have different ideas about pricing their products. The upgrade kits we used cost $295 and $110, respectively. You're reading that right: IBM's product is priced lower than Microsoft's. Even nonupgrade packages reflect this difference: Windows NT is $495 and OS/2 is $225. Some of this pricing reflects the tremendous amount of network doodads built into Windows NT, but $495 seems a bit pricey for a PC operating system.

Which operating system you choose has less to do with its technical merits than it does with your preferences: Do you like the Windows or the OS/2 user interface? We found ourselves split down the middle: For familiarity's sake, we'd go with Windows NT, but OS/2 looks nicer.

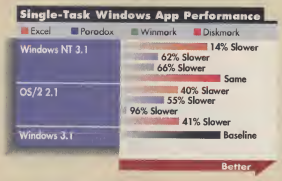
JOHN MONTGOMERY

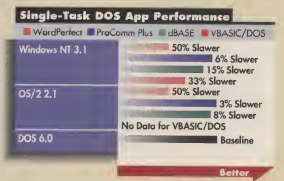
OS/2 2.1 • $225 • IBM CORP. • (800) 426-2468
Circle No. 602 on Reader Service Card

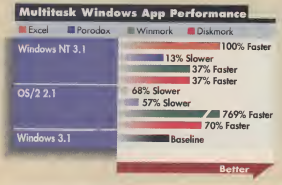
WINDOWS NT 3.1 • $495 • MICROSOFT • (800) 426-9400, (206) 882-8080
Circle No. 601 on Reader Service Card

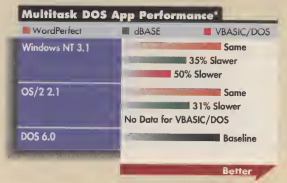
PERFORMANCE BLUES

You can't expect life to turn up roses all the time. Despite some powerful features, OS/2 2.1 and Windows NT 3.1 have a little performance problem, particularly when they're running nonnative DOS and Windows 3.1 apps. That's a nice way of saying they're slow. Not jaw-clenching slow, but slower than Windows 3.1 at single tasks.









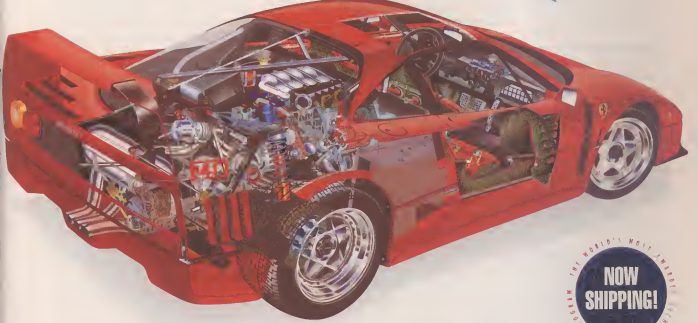
*Running under Windows 3.1 so they could multitask.

FASTEN YOUR SEAT BELTS. THIS DOESN'T RUN ON CLIP ART.

There's no getting around the fact that some jobs in life require technical gear. You wouldn't attempt brain surgery with a butter knife and bandaids. Or mountain climbing with just gym shoes and some twine. • So if you're a technical illustrator working in Windows™, you've probably found that pasted together programs and reams of clip art are no substitute for a real precision drawing package. **CANVAS™ WINDOWS PUTS IT ALL TOGETHER.** Step into a single, flawlessly integrated universe - and take control with professional-grade features like our programmable Smart Mouse™ drawing aid. Flexible auto-dimensioning, linked lines and cell macros. Custom parallel lines and curves. Unbeatable Bézier curve control and manipulation. 24-bit color pixel-level editing of scanned art and auto-tracing. Precision text handling, including fractional leading and kerning and sophisticated wrap, fill and bind tools. TrueType™ and PostScript™ font-to-Bézier curve conversions. And a host of special effects, including Envelope and Extrude. **AND YOU PUT IT WHERE YOU WANT IT.** Canvas' revolutionary Open Architecture allows you to totally customize your work environment - turning on and off program features at will, creating tool sets for specific jobs, and importing and exporting freely in virtually any file format (including seamless compatibility with Canvas Macintosh®). Best of all, this organizational structure makes Canvas self-upgrading: to plug in tomorrow's newest tools, simply drag them into a designated directory. No waiting. No converting. No hassle. **ATTENTION CORELDRAW™, MICROGRAFX DESIGNER™ AND HARVARD GRAPHICS/DRAW®, USERS.** Shift into passing gear for the special introductory price of only $99 + shipping and handling. Just call (305) 596-5644 today and order your trade-up to Canvas Windows at an incredible $300 off our suggested retail price of $399. Major credit cards accepted.

CANVAS
WINDOWS VERSION
THE HIGH PERFORMANCE DRAWING ENVIRONMENT FROM DENEBA SOFTWARE

Deneba



THE WORLD'S MOST INTUITIVE GRAPHICS BUSINESS SOFTWARE

NOW SHIPPING!

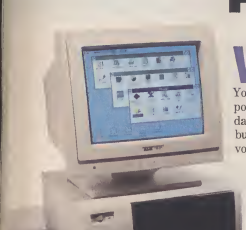
Circle 180 on reader service card.

For more information or the name of your nearest dealer call (305) 596-5644 or FAX (305) 273-9069. Deneba Software 7400 Southwest 87th Avenue Miami, Florida 33173 ©1993 Deneba Systems, Inc. Canvas® and Smart Mouse™ are trademarks of Deneba Systems, Inc. All other trademarks are the property of their respective holders. The Ferrari F-40 illustration was created entirely in Canvas

BUSINESS GRAPHICS | TECHNICAL ILLUSTRATION | GEOLOGY | ARCHITECTURE | ENGINEERING | AEROSPACE

DRAWING A BEAD ON THE NEW PC STANDARD . . .

Pentium: A Big Boost



ALR Wins
On one hond, you'd expect a Pentium system to whip the prior-generation Tri-Star and Gateway PCs in Windows speed tests. Sure enough, ALR's Evolution V completed our CPU- and disk-intensive Windows application benchmarks 22 to 24 percent faster than even our former speed champ, the Dell Dimension XPS 466V.

But on the other hond, post tests have taught us that just slapping a bigger engine on a system board doesn't necessarily translate into power for your applications. The real benefit shared by all of these systems is that their highly cached subsystems are well tuned.

The Pentium chip combined with the Evolution V's system board take that art to a new level. In fact, our testing leader calls the ALR-designed motherboard "as sweet as they come." Not every system board you see with a Pentium on it in coming months will deserve that plaudit.

WHY BUY A Pentium PC? Well, Intel has always put forward multimedia as a prime reason. You just can't have too much processing power when mingling high-bandwidth data types in applications such as business audio, video capture, and voice synthesis.

With roughly three times as many transistors, twice the on-chip cache, and double the raw throughput of a DX2/66, the Pentium is clearly the big boy on the block. But applications must be recompiled to take full advantage of the chip's unique features, and precious few Pentium-specific apps are available.

Can one of the early Pentium PCs help you tote your Windows load, or should you wait until the software catches up? To find the answer we matched a pair of the most fully packed 486DX2/66-based systems we could find against Advanced Logic Research's new Evolution V, one of the first Pentium-based desktops to hit the streets (and at a very tantalizing price). Carrying the banner for the 486DX2 is the 486-VL Multimedia Solution from Chandler, Arizona, mail-order provider Tri-Star Computer, and the multimedia version of one of last year's best-selling desktops, Gateway 2000's 4DX2-66V.

And the Winner Is . . .

We won't keep you in suspense. Properly used, the Pentium makes a big difference. The Evolution V not only beat the Tri-Star 486-VL and Gateway 4DX2-66V in our real-world Windows application test suite, it turned in the fastest numbers we've seen to date on any desktop. It also did well on our very rudimentary multimedia test suite—benchmarks that Gateway's 4DX2-66V failed. The Tri-Star 486-VL shone brightest because of its higher-quality Texel CD-ROM drive.

And therein lies the real story behind these machines: Whether you're creating a desktop video marathon or just crunching a big spreadsheet, it's not just the number in the name that counts, but the quality of the subsystems that support the 50 this or 66 that. In general, this trio's top-notch motherboards and video cards, fast hard drives and cache—tons of cache—make them all screamers. Specifically, all three support their processors with 256K of external cache, all cache their hard drives, and, of course, all have local-bus video with better-than-average video memory. The subline on the trio is "no bottlenecks."

The CAD Company That Could

Tri-Star, which formerly concentrated on building CAD workstations, comes to multimedia with a high-end, floor-standing tower with expandability that matches its zip. Don't be misled by the fact that it placed fourth behind the ALR, Gateway, and Dell in our Windows application test suite. Those other guys happen to be the three fastest Windows desktops we've ever tested. Tri-Star is definitely running with the big dogs.

The Tri-Star 486-VL offers snappy graphics performance, going from zero to Windows in a flash on boot up, thanks to its Cardinal Warpspeed Weitek P9000-based accelerator. With a standard 2MB of fast VRAM, we got 65,000 colors at 1,024-by-768-pixel resolution. We even displayed 256 colors at 1,280-by-1,024-pixel resolution on Tri-Star's 17-inch Mag MX17 monitor.

The Tri-Star 486-VL's 13-millisecond Caviar 340MB hard drive from Western Digital is turbocharged by a Tekram 32-bit VL-Bus controller with a very hefty 2MB of cache memory. It would be overkill for most applications, but if you're into something like video capture and playback in a major way, you could boost the cache all the way to 16MB (these folks really show their CAD roots). Likewise, Tri-Star outfits its standard systems with a very convenient feature it developed for CAD: removable 1-inch-high hard disks, each of which fits neatly into a locking slide drawer and offers increased security. You can use a second drive as a portable storage volume or for a quick mirror-image backup.

At 24½ by 17⅞ by 7½ inches, the Tri-Star 486-VL is a tall tower, but it still fits snugly under your desk. For $4,895, the base unit

for Multimedia?

The Tri-Star 486-VL's Texel CD-ROM and Aztech Sound Galaxy NX Pro 16 sound card make the system a multimedia standout.

includes the multimedia kit (16MB of RAM, a 340MB hard drive, a 17-inch monitor, and Microsoft Mouse), Windows 3.1, and DOS 6.0. That's a lot of good stuff for a very reasonable price.

1992 MVP Champ Weighs In

Gateway's DX2-66V, meanwhile, still comes with the same baby AT case it had last year when it took the market (and our 1992 MVP Award) by storm, selling a fully packed 486DX2/66 for $500 to $1,000 less than you could find anywhere else. Now, for the same $2,995 price, you get a multimedia kit and an upgrade of a lot of the other features.

For example, now you get a way-above-average 16MB of RAM and a jumbo 424MB Western Digital hard disk with a 13ms access time and data transfers bolstered by 128KB of cache. The Gateway 4DX2-66V has a proprietary local-bus IDE controller integrated into the system board, which is one reason it did so well on our disk-intensive Windows application benchmarks.

A baby AT it may be, but there are no expandability problems here. You get five open ISA slots, one of which is occupied by the high-end Media Vision SoundBlaster 16 audio card that controls a Mitsumi Crme CD-ROM drive. ATI's Mach32-based Ultra Pro VESA local-bus graphics adapter sits in one of two VL-bus slots on the Gateway 4DX2-66V's high-end Micronics motherboard, leaving the other open for a still-faster hard drive controller or LAN adapter. We tested the Ultra Pro displaying 65,000 colors at 1,024-by-768-pixel resolution on the standard 15-inch CrystalScan 1572 FS monitor.

The system ships with DOS 6.0, Windows 3.1, a mouse, and your choice of one of eight Windows productivity software offerings—solid packages such as Microsoft's Excel or Works, and Borland's Paradox.

The New Breed of Heavyweight

ALR's base price of $2,495 for a stripped-down Evolution V is designed to garner maximum attention, but you'll need to pay more to configure it to match our two 486DX2/66 competitors. The Evolution V will still be inexpensive, but considering the custom design touches ALR has applied, it can in no way be called cheap.

Of course, the Pentium gives the Evolution V more horsepower than a DX2/66 (60MHz throughout compared with 66MHz internal and 33MHz external clock for the DX2/66 machines). But as with the Tri-Star and Gateway entries, other performance-maximizing features are more important at this date. Nowhere is cache more necessary than with the Pentium. The Evolution V's 256KB of write-back cache usually helps accomplish memory-to-CPU data transfers in a single tick of the system clock. ALR also supports the Pentium's own write-back mode, which lets the processor post instructions to cache and move on without having to wait for writes to memory.

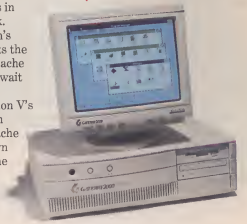
Outside the chip, the Evolution V's system board's 64-bit data path between CPU, memory, and cache complements the Pentium's own 64-bit data bus to make sure the Pentium is kept "well fed." Although there are precious few 32- and 64-bit apps around (Pentium-optimized or

Set for Prime Time?

We've seen very spotty performance from multimedia PCs as a group. The industry is just now switching over to the MPC Level II standard, and system vendors are having trouble getting new parts integrated.

Both the ALR Evolution V and Tri-Star 486-VL multimedia components' dual-spin synchronization between video and audio performed fine under Intel Indeo tests.

Unfortunately, the Gateway 4DX2-66V (below) was like a lot of the systems we've seen. We were never able to spin its Mitsumi CD-ROM drive faster than 178 kilobytes per second or get it in sync with audio. It failed every video test we have. Many multimedia systems just weren't ready for prime time when we were doing our testing. That should have improved by the time you read this, but check your system closely.



CHOOSE FAST OR FASTER

The Dell Dimension XPS 486V that we reviewed in October (see "Multimedia Explosion," page 138) was already cookin'—the fastest DX2/66 we've tested. Gateway, with the same motherboard and many of the same components, matched it in our Excel and Word for Windows tests.

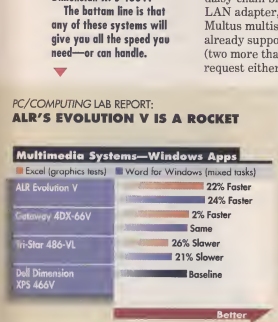
Likewise, at 4 minutes and 4 seconds in Excel tests and a tad less than 4 minutes in Word, Tri-Star's 486-VL Multimedia Solution was not far off the mark—and it turned in the best multimedia performance of the bunch.

Naturally, the ALR Evolution V, with its Pentium-tuned motherboard, did well, lagging 22 to 24 percent better Windows performance than the Dimension XPS 486V.

The bottom line is that any of these systems will give you all the speed you need—or can handle.

PC/COMPUTING LAB REPORT:

ALR'S EVOLUTION V IS A ROCKET



not), the Evolution V still makes effective use of the Pentium's double doorway by sending 16-bit Windows software instructions at about four words at a time. It also uses the still-faster burst mode on a high percentage of instructions.

For video-intensive multimedia, you have your choice of 32-bit VESA local-bus graphic adapters—either a Paradise Accelerator VLPlus from Western Digital using the company's WD90C33 or the same ATI Ultra Pro VLB used on the Gateway 4DX2-66V—yielding a pleasing 16.7 million colors at 800-by-600-pixel resolution and 65,000 at 1,024 by 768 pixels. The standard 14-inch ALR FlexView 3X NI monitor is a bit undersized for multimedia, but it displays a respectable 1,024 by 768 noninterlaced with 0.28mm dot pitch. We suggest you add ALR's FlexView 4X NI noninterlaced monitor, which is capable of displaying 1,280 by 1,024 noninterlaced with 0.28mm dot pitch.

Expandability Plus

Although it has a fairly small footprint, the Evolution V has the expandability of a minitower. You get an unusual three 32-bit VESA slots (two open after the graphics adapter), plus three open ISA slots. You might normally use a slot to daisy-chain big SCSI drives or for a fast LAN adapter, but the Evolution V's new Multus multiseek hard-drive controller already supports four IDE hard drives (two more than normal), and you can request either a 10BaseT or 10Base2 Ethernet adapter on the motherboard as an option.

The Evolution V has a bountiful six drive bays, one of which is filled with your choice of 170MB, 240MB, or 340MB 13ms hard drives. You also can opt for a $713, 8ms 540MB drive. If multimedia is your intent (or even if it isn't) the 340MB drive is a practical minimum (hard drive prices have recently dropped by about a third to about $1 a megabyte). To make sure you have no heat problems with the bigger, hotter Pentium, ALR includes three fans—one pulls hot air up and off the Pentium, and another blows air from the front bezel through the CPU's heat sink to the back of the system where it's dissipated by the power supply fan. This is probably a bit more engineering than necessary. Generally, we've found that a heat sink atop the Pentium housed in a well-ventilated case provides about all the cooling that you will need. Still, this attention to detail is indicative of the care that ALR took in the design of this system. It earned it a nomination for our 1993 MVP Award.

You don't get any software with ALR's multimedia option—just DOS 6.0 and Windows 3.1. But the premium for ALR's Media Vision 16-bit SoundBlaster-compatible sound card and dual-spin Kodak CD-compatible Texel CD-ROM drive is only $525. By the time you've configured the Evolution V with that multimedia kit, 16MB of RAM, a 340MB hard drive, and a 14-inch monitor, the suggested retail price is $4,760. But, unlike Gateway and Tri-Star, ALR sells the Evolution V through retailers, so figure about $4,260 for this truly state-of-the-art PC.

Is It Worth It?

The Evolution V costs a lot more than the Gateway 4DX2-66V, less than the Tri-Star 486-VL, and a long way from the $10,000 you used to have to pay for a new-generation system. There's no question that you get more oomph for the dollar, but is it worth the extra bucks to you? Only you can answer.

That's no cop-out. The Gateway 4DX2-66V is quite a bit cheaper, but we have questions about its multimedia performance. That aside, all of these systems are so high end—each with unique strengths—that it's really hard to choose between them.

MIKE HOGAN

ALR EVOLUTION V • $4,760 • ADVANCED LOGIC RESEARCH • (800) 444-4257, (714) 581-6770
Circle No. 603 on Reader Service Card

GATEWAY 4DX2-66V • $2,995 • GATEWAY 2000 • (800) 523-2000, (605) 232-2000
Circle No. 604 on Reader Service Card

TRI-STAR 486-VL MULTIMEDIA SOLUTION • $4,895 • TRI-STAR COMPUTER CORP. • (800) 578-2799, (602) 961-3401
Circle No. 605 on Reader Service Card

A little hard work never hurt anyone. A lot of hard work however is an entirely different story. Especially if we're talking about system printers. If they go down, the flow of information within your company can come to a grinding halt. Which means your business may come to a grinding halt.

You don't want that. Neither do we.

We're Pennant Systems, an IBM Company 100% dedicated to printing. Pennant™ offers printers, printing software, maintenance and other services that are designed to keep your company's data flowing. Seven days a week, 24 hours a day if you need to. Regardless of the application or the hardware you're using. We also support a broad range of printer data streams including IPDS,™ PostScript® PCL® and others, without having to rewrite your application code.

Our printers are engineered to handle most of what your business needs to print. Whether it's bar codes, invoices, simple text or complex reports, no other company offers you as many options in quality printers as Pennant.

Take for example our newest additions to an already big family of products. The 4232 matrix printer uses either cutsheet or continuous form paper. The 6408 line printer is perfect for office environments because at 52 dBA it's as quiet as most laser printers. Our 30-page-per-minute 3930 Page Printer can handle a wide range of attachments, while our 3916 Page Printer, with optional duplex printing, is perfectly priced for entry-level buyers.

And those are just our newest offerings. Chances are if you have a need for a non-impact, line or serial printer, Pennant can help.

If you'd like more information on these or any of our other printers, please call 1-800-PENNANT anytime. Because working around the clock applies to more than just our printers.

ADVOCATES OF THE 168-HOUR WORK WEEK.

Redefining Printing.™

PENNANT™

An IBM Company

© 1993 IBM Corporation. All rights reserved.
Pennant Systems, IPDS, Redefining Printing and the Pennant logo are trademarks of IBM Corporation.
PostScript is a registered trademark of Adobe Systems, Incorporated. PCL is a registered trademark of Hewlett-Packard Company.

New!

FLASH! ANNOUNCING NEW STANDARDS FOR LASER PRINTERS . . .

Green Printers: Cheap

STEPPIN' OUT

You don't buy a personal laser printer to win speed contests, but most of our green laser printers offer performance at least comparable to HP's LaserJet 4L. The fastest printer overall was the 6-page-per-minute Brother HL-6, which outdistanced the others by a considerable margin. The HL-6 printed our WordPerfect document in 1 minute and 57 seconds, and our Word for Windows document in 2 minutes and 11 seconds.

Closely following the HL-6 was Okidata's 4-ppm OL400e at 2 minutes and 25 seconds for WordPerfect and 2 minutes and 41 seconds for Word for Windows. The NEC Silentwriter, while fastest for Windows text at 2 minutes and 8 seconds, was slowest for DOS text at 3 minutes and 33 seconds. And the LaserJet 4P was the slowest overall, turning in 600-dpi output at just about the same speed as the LaserJet 4L.

The Brother HL-6 (left) may be the fastest green printer we looked at, but it's the Hewlett-Packard LaserJet 4P's 600-dpi print quality that really shines.

SO YOU THINK you can't afford a green laser printer? Think again! For less than $1,000 you can pick up a 4-page-per-minute personal laser printer that includes 45 scalable typefaces, Enhanced PCL 5, and true 600-dot-per-inch resolution. Better still, sacrifice a few features and the street price falls to a low $500, reasonable enough even for those on a tight budget to get into the laser game.

We looked at a quartet of new 4- and 6-ppm laser printers: Brother International's HL-6, Hewlett-Packard's LaserJet 4P, NEC Technologies' Silentwriter SuperScript 610, and Okidata's OL400e. Each has a street price of less than $1,000 and a power-conservation mode that saves in operation costs. To date, most printers haven't had a power-down mode, but in the environmentally conscious 1990s, it's hip to be "green."

You've no doubt been inundated with green devices, but don't be blinded into thinking printer manufacturers are lemmings following a marketing trend. Of all computing devices, printers are the biggest power hogs, ingesting about 300 watts during printing, compared with a typical monitor's 120 watts and a 486DX computer's 40 watts. All the printers we examined have a fuser sleep mode, during which they draw fewer than 30 watts—low enough to meet the Environmental Protection Agency's Energy Star guidelines.

Greenest of Them All

Power savings usually come with a caveat. Because the printer reduces power consumption by shutting off the fuser in sleep mode, waiting for it to warm up again can seem interminable. It actually takes only about 20 or 30 seconds, but when a letter needs to go out in today's FedEx and it's 4:59 p.m., the seconds count.

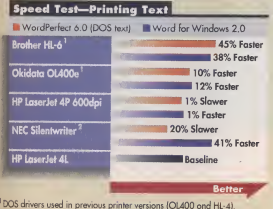
Of the four printers we looked at, HP's LaserJet 4P offers the best combination of power savings and convenience. Its "instant-on" fuser is just that, powering up almost instantaneously with no noticeable waiting. The HL-6, Silentwriter, and OL400e all make you wait. The Silentwriter was the worst offender, because it also ties up the computer completely while printing. That means you're stuck waiting for the printer to warm up, then print your document before you can get back to work.

The LaserJet 4P also had the edge for print quality with its native 600-dpi engine, although all the entries printed acceptable business-quality text and graphics.

For printing straight text documents, however, the LaserJet 4P had the slowest performance, although NEC's Windows-only

PC/COMPUTING LAB REPORT:

BROTHER IS FIRST TO THE FINISH



[1] DOS drivers used in previous printer versions (OL400 and HL-4).
[2] Prints DOS from within Windows on a 486DX/33MHz with 4MB of RAM.

and Politically Correct

Silentwriter was also slow. It printed DOS text even slower than the LaserJet 4P, taking 3½ minutes to print our 10-page WordPerfect DOS document. For Windows-only printing, however, the Silentwriter can't be beat; it printed our 10-page Word for Windows document in just over two minutes. But the overall fastest printer, regardless of operating environment, was Brother's 6-ppm HL-6, which took about two minutes to print our WordPerfect document and slightly longer for our Word for Windows document.

The Verdict

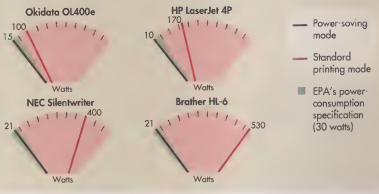
The LaserJet 4P is also the most expensive printer of the bunch. With a list price of $1,229 and a street price of $999, you'll pay for the instant-on fuser, 45 resident scalable fonts, and 600-dpi print quality. The other printers we looked at are less expensive—for example, the OL400e costs only $499 on the street—but they sacrifice some features we'd like to see in a business-class laser printer.

Both the OL400e and the HL-6, for example, include only 512K of RAM, which is sufficient to print most text documents. Both printers, however, required additional memory to print our 4-page Freelance Graphics presentation.

The Silentwriter also cheats by relying entirely on the computer to process pages. The drawback is the system requirements—a Windows-ready machine with 4MB of RAM and 12MB of free disk space.

While bargain lasers, such as the HL-6, OL400e, and Silentwriter, are available in the $500-to-$600 range on the street, you will make some sacrifices to pay that price. For a few hundred dollars more, HP's LaserJet 4P offers the functionality of a LaserJet 4 at a 4-ppm price. **CYNDY BATES**

PC/COMPUTING LAB REPORT:
THE SAVINGS AREN'T THE SAME

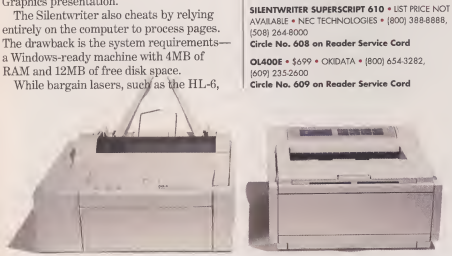


HL-6 • $895 • BROTHER INT'L • (800) 276-7746, (908) 356-8880
Circle No. 606 on Reader Service Card

LASERJET 4P • $1,229 • HEWLETT-PACKARD • (800) 752-0900, (415) 857-1501
Circle No. 607 on Reader Service Card

SILENTWRITER SUPERSCRIPT 610 • LIST PRICE NOT AVAILABLE • NEC TECHNOLOGIES • (800) 388-8888, (508) 264-8000
Circle No. 608 on Reader Service Card

OL400E • $699 • OKIDATA • (800) 654-3282, (609) 235-2600
Circle No. 609 on Reader Service Card



NEC's Silentwriter SuperScript 610 (left) churns out Windows documents as fast as you can say (or select) "File, Print." Okidata's OL400e $499 street price rivals that of ink jet printers.

WATTS DOWN, DOC!

All the printers we tested save big on power to meet the EPA's Energy Star guidelines. Green printers draw full power during printing, then go into sleep mode. The fuser on all printers—green or not—is heated to about 400 degrees during printing. Most printers require about 300 watts to maintain the heat constantly; green printers, however, let the fuser cool down between print jobs, thereby saving energy.

While a sleep mode cuts operating costs, it can leave you hanging while the fuser reheats to the proper temperature. HP's LaserJet 4P comes to full printing temperature in a few seconds and uses minimal power overall.

FINALLY, ONE-STOP SHOPPING FOR E-MAIL

The Universal Post

IT'S A TIME-SAVER
Whether you're sending e-mail across the office or around the world, E-Mail Connection makes it easier. The program provides a consistent interface for multiple e-mail services, so you don't have to learn to

navigate each one. From the Mail Systems dialog box you can install, configure, or log on to the four basic services directly supported by E-Mail Connection (top screen). You can also view a log that shows details of previous communications sessions.

Serious e-mail users will

appreciate E-Mail Connection's hierarchical folder structure for storing messages (bottom screen). You can drag and drop messages between folders and automatically file incoming messages in specific folders.

ARE YOU SICK of careening around between too many e-mail services? Do you yearn for the simplicity of envelopes and postage stamps? Try Connect Software's E-Mail Connection, the first of an innovative breed of products designed to sweat the details of exchanging e-mail with many different services.

E-Mail Connection doesn't quite live up to its billing as a universal e-mail interface, but it's no slouch. The program communicates directly with MHS- and MAPI-based network mail systems as well as the CompuServe and MCI Mail public systems. Because it understands addressing conventions of other public services like the Internet, GEnie, and America On-Line, E-Mail Connection lets you exchange mail with those services via CompuServe or MCI Mail.

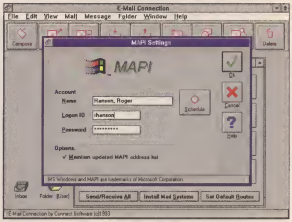
No Futzing

E-Mail Connection is easy to set up. First, enter the account information for each service you use. E-Mail Connection includes the domestic dial-in numbers for CompuServe and MCI Mail. To add names to your address book, specify users' services and e-mail addresses, and provide a default for people on multiple services.

To write messages, you can use E-Mail Connection's editor or any MAPI-aware application, such as Word for Windows. To send mail from MAPI-aware applications, select File, Send Mail. E-Mail Connection pops up, and you send the message in binary format—as an attachment—or transfer the text to E-Mail Connection's editor and send it as a message.

You address messages by pointing to the recipient's name in a list box and clicking—which makes sending a message to recipients on different mail systems a snap.

E-Mail Connection stores messages in a set of hierarchical folders. One whizzy feature lets you automatically file incoming messages in specific folders. For example, you can tell



To set up your own e-mail services in E-Mail Connection, you enter basic account information in this clear, simple dialog box.

the product to store messages from your boss in a High Priority (or Low Priority) folder.

E-Mail Connection is even flexible about routing messages to the public services that it doesn't support directly. The program uses either MCI Mail or CompuServe—whichever service you belong to. If you belong to both and the default route is too expensive or unreliable, specify the other by pointing and clicking in a list box.

On the Wish List

Despite all of these virtues, a few kinks still need to be ironed out. One is that when you tell the program to check for mail, a dialog box needlessly pops up asking whether you want to send mail, receive it, or both.

Other complaints involve E-Mail Connection's interactions with public mail services. The initial release doesn't support high-speed modems—9,600 bits per second and faster—for connecting with MCI Mail, although Connect plans to correct this.

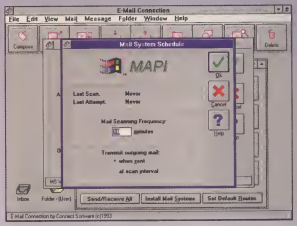
If you deal with only one e-mail system, you don't need E-Mail Connection. But to simplify communicating with many services, check it out. Its solid integration with MAPI-aware applications and its interface make life much easier. **DAVID HASKIN**

E-MAIL CONNECTION • $99.95 • CONNECT SOFTWARE • (206) 881-8251
Circle No. 610 on Reader Service Card

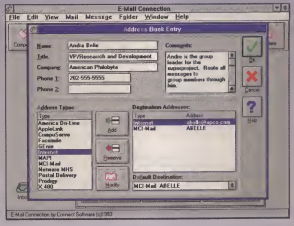
Office: E-Mail Connection

From Setup to Searching, It's Clean

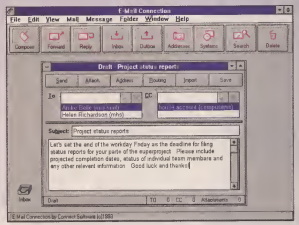
Connect Software's E-Mail Connection is great for anyone who has better things to do than learn multiple e-mail interfaces. While the program directly supports only four types of e-mail, E-Mail Connection still lets you send messages—easily—to services like the Internet. We found tasks like setup, messaging, and searching easy to do.



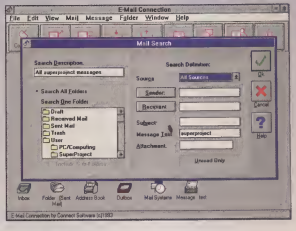
1. During setup, you can tell E-Mail Connection to send and receive mail at preset intervals. To set up periodic mail check-ins, just specify the number of minutes in the Mail Scanning Frequency box. Above, we've set the default at ten minutes.



2. To add names to the address book, just enter the users' basic information, such as which services they belong to and their addresses on each service. If someone belongs to more than one service, E-Mail Connection lets you choose a default system.



3. Add as many recipients to messages as you want, regardless of which services they belong to. Just write your message, select recipients, and send. Rather than making you log on three times to three products, E-Mail Connection thinks globally.



4. With E-Mail Connection you can search for messages by contents, sender, or service. You can also automatically route related messages to one folder. For example, you can gather all messages for a project and place them in a project folder.

MEDIA VISION RESOURCE

"BRILLIANT DEALS FROM MEDIA VISION!"

THUNDER BOARD

- Great 8-bit sound card for beginners
- AdLib™ & Sound Blaster™ compatible
- Joystick port
- 11-voice FM synthesizer

Only $59

Fusion CD16E

- An ideal multimedia starter kit
- Award-winning 16-bit PC sound card
- High quality external CD-ROM drive
- Amplified speakers
- 5 exciting software packages

$399

Pro 16 Multimedia System

- The ultimate multimedia upgrade kit
- Award-winning 16-bit sound card
- Double-speed NEC CD-ROM Drive
- Exciting software collection, including Compton's Multimedia Encyclopedia & Carmen Sandiego

$599

Pro AudioSpectrum Plus Sound Card

(SCSI or Sony interfaces)

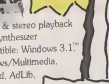
- 8-bit sampling & stereo playback via 20-voice synthesizer
- Highly compatible: Windows 3.1™, MPC,™ Windows/Multimedia, Thunder Board, AdLib, Sound Blaster
- Easy installation

$99

Thunder & Lightning Audio/Video Adapter

- 1MB sound & videocard with Yamaha synthesizer, joystick port
- Thunder Board, AdLib, Sound Blaster compatible
- 16.8 million colors supported in high resolution
- 24-Bit SuperVGA

$139



AudioPort PC Audio Device

- High performance portable module for PCs and notebooks
- Plugs into parallel port of any IBM PC/AT, PS/2 or notebook
- Transport Sound™ technology & built-in speakers
- Headphone & external speaker inputs

$69

Call 1-800-684-6699

Monday thru Friday 7:00 am to 6 pm PST

© 1993 Media Vision, Inc. 3185 Laurelwood Court, Fremont, CA 94538 (510) 770 8600 Thunder Board, Fusion CD 16E, Pro 16 Multimedia System, AudioPort, Thunder & Lightning and Pro AudioSpectrum Plus are all trademarks of Media Vision, Inc. Any other trademarks and registered trademarks are owned by their respective holders

All and any software bundles and prices are subject to change without notice.

VISA MasterCard

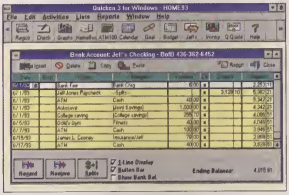
MEDIA VISION RESOURCE

Circle 156 on reader service card.

Quicken for DOS and Windows—Two Champs One-Up Themselves

How do you make a good thing better? Ask Intuit, maker of Quicken financial-management software. Both Quicken 3.0 for Windows and Quicken 7.0 for DOS are easier to use than ever.

While Quicken 3.0 for Windows may look just like its predecessor, the differences become obvious when you start using the program. On a cosmetic level, selected check boxes have a bold check instead of a subtle *X*, dialog box buttons incorporate easily understood icons, and a scrollable icon bar provides access to commonly used functions.



The Windows version of Quicken is finally the one to beat. Among other usability improvements, a mini icon bar sits at the top of the check register window for one-click convenience.

But the usability improvements don't stop there. The transaction-entry window has been enhanced to speed up data entry. An icon bar at the top of the window offers buttons that help you insert new transactions, delete or copy a selection, and paste items into the register. Click on the pull-down arrow in a date field, and Quicken for Windows displays a small calendar to help you select the correct date.

Quicken for Windows has always featured a lot of reports, but Version 3.0 reduces the hassles in creating them. Version 2.0 bounced you from window to window, making you change filters in one and options in another to fully define preferences. Now, all reports are created in one simple dialog box that lists all the available reports by report family (Home, Investment, Business, and so on). Simply click on the Customize button to change the reporting period or other parameters.

Intuit has also added Quick Reports to streamline transaction searches. If you think you've duplicated a transaction, select it and choose Report from the register icon bar. Quicken displays a report of all transactions that match the payee in your chosen transaction.

Intuit made a point of offering as many of the same features as possible in both the DOS and Windows upgrades of Quicken. And while Quicken 7.0 for DOS is no slouch, it is limited by the DOS interface.

For example, the new financial calculator in both versions of Quicken reminds you of payments due and helps you forecast cash flow. Like the Windows version, Quicken 7.0 for DOS accepts scheduled transactions and lets you post notes to any day on the calendar. Unlike the Windows version, however, Quicken 7.0 for DOS can't graph your future cash flow using the scheduled transactions.

The new reports in the DOS version are also more limited than those provided in the Windows version. Reports such as the Missing Check report and the Comparison Report work much like they do in the Windows version, but the Quick Report in DOS looks more like a list than a report.

The new DOS version benefits from the Qcard technology previously introduced in Quicken for Windows. Qcards are handy reminders of context-sensitive actions, available throughout the program.

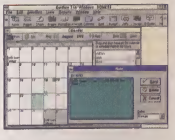
Quicken users will be extremely pleased with the changes in both versions and shouldn't hesitate to upgrade. If you're new to the world of computerized personal finance, we recommend Quicken 3.0 for Windows—the interface shines. **MIKE FALKNER**

QUICKEN 3.0 FOR WINDOWS • $69.95 • INTUIT • (800) 624-8742, (415) 322-0573
Circle No. 612 on Reader Service Card

QUICKEN 7.0 FOR DOS • $69.95 • INTUIT • (800) 624-8742, (415) 322-0573
Circle No. 611 on Reader Service Card

Back in the Black

Does your checkbook balance dip frighteningly low as payday approaches? Both Quicken 3.0 for Windows and Quicken 7.0 for DOS include a financial calendar to help you



plan for upcoming expenses.

If your problem is simple forgetfulness, you can post reminder notes to any day in the calendar (top screen). The calendar also displays transactions due. The Windows version automates the process further: Simply drag a transaction from a list

box on the right side of the screen onto a date on the calendar (bottom screen), and Quicken schedules the transaction after asking you to verify it.

The EXACT configuration you want.
At an affordable price.
Assembly no longer required.

AMBRA.
WE CUSTOM-BUILD. SO YOU DON'T HAVE TO.

Complete customization — at no extra cost.

Sorry to disappoint all you hands-on, do-it-yourself types. Likewise, you people who insist on paying for every service that comes your way. When it comes to customizing AMBRA™ computers, you can leave your tools in the box and your money in the bank. Just send us your specs. We'll build you a ready-to-run computing solution including everything from your choice of processor to your choice of word processor. Plus your choice of options, preinstalled. And you won't pay an extra penny for the service, or wait an extra day.

High-powered technology — without high prices.

A word to the power-hungry: You can put away that huge purchase order. AMBRA offers the latest and leading industry-standard technology — like blazing-fast IBM® Blue Lightning™ processors, Intel® Pentium™ complexes, advanced video subsystems, high-speed local bus architecture, and lots more — for lots less.

Here's how: Sourcing worldwide from the best suppliers, we buy smart and bargain aggressively. And because we keep our overhead low, when you buy direct from us, we pass our savings directly along to you.

Prompt service and support — no empty promises.

Now, for you savvy buyers: We know you're looking for more than a mere computing "bargain." Quite rightly, you want to be sure of receiving rapid service and ready support. That's why we've contracted with IBM to back AMBRA systems with rock-solid one-year warranties. You can count on expert technicians nationwide to deliver onsite service within two days of your call, Monday through Saturday.[1] You can also rely on a toll-free support line for answers any time you need them — technical representatives are standing by to assist you 24 hours a day, every day.

Money-back guarantees — not gimmicks.

Finally, to all our new and soon-to-be-new friends: We absolutely want you to be satisfied with your customized AMBRA system. If, for any reason you're not, you can simply return it within 30 days for a full refund.[1,2] We're committed to delivering exactly the computer you want, exactly the way you want it, at a price that's only surprising in terms of its thriftiness. We build it your way. To meet your needs. And, if you're not happy, we'll give your money back.

1-800-25-AMBRA

AMBRA invites you to design the world's most important computer. Yours.

SLIMLINE (3x3)

Processor ☐486SLC2, 50 MHz ☐486SX, 25 MHz ☐486DX, 33 MHz

Memory ☐4MB ☐8MB ☐16MB ☐Other___MB

Hard disk ☐120MB ☐170MB ☐240MB ☐340MB

DESKTOP (5x5)

Processor ☐486 Blue Lightning, 66 MHz ☐486DX2, 66 MHz

Memory ☐4MB ☐8MB ☐16MB ☐32MB ☐64MB

Hard disk ☐170MB ☐240MB ☐340MB ☐440MB

MINITOWER (8x6)

Processor ☐486 Blue Lightning, 66 MHz ☐486DX2, 66 MHz

Memory ☐4MB ☐8MB ☐16MB ☐32MB ☐64MB

Hard disk ☐170MB ☐240MB ☐340MB ☐440MB

EISA DESKTOP (8x6)

Processor ☐486DX2, 66 MHz ☐Pentium, 60 MHz

Memory ☐8MB ☐16MB ☐32MB ☐64MB

Hard disk ☐170MB ☐240MB ☐340MB ☐440MB ☐540MB SCSI-2*

EISA TOWER (8x12)

Processor ☐486DX2, 66 MHz ☐Pentium, 60 MHz

Memory ☐8MB ☐16MB ☐32MB ☐64MB ☐Other ____MB

Hard disk ☐170MB ☐240MB ☐340MB ☐440MB ☐540MB SCSI-2

*Not available with 486DX2, 66 MHz processor.

MONITORS

14-inch ☐VGA color ☐SVGA color ☐UVGA color

15-inch ☐AMBRA Flat Square Tube ☐NEC Multisync 4FGE

17-inch ☐AMBRA Flat Square Tube ☐NEC Multisync 5FG

21-inch ☐NEC Multisync 6FG

OPTIONS

CD-ROM ☐Internal drive and software ☐Multimedia Kit

Modems ☐Data/Fax internal ☐2400 bps internal

Tape backup drive ☐120MB internal/external ☐250MB internal/external

Graphics accelerator ☐ATI Ultra Pro Graphics VL

Printers & scanners ☐IBM Personal Printer II (24-pin) ☐IBM LaserPrinter 4039 (12 ppm) ☐IBM LaserPrinter 4029 (10 ppm, 6 ppm) ☐Calera WS Complete PC Scanner

SOFTWARE

Word processing ☐Lotus Ami Pro ☐Microsoft Word® ☐WordPerfect

Accounting ☐Quicken

Spreadsheet ☐Microsoft Excel® ☐Lotus 1-2-3 ☐Quattro Pro

Graphics/ presentation ☐Lotus Freelance Graphics ☐Microsoft PowerPoint®

Comm/fax ☐WinFax Pro

Customized computers at uncommonly smart prices.

Slimline SuperSavers

- 486SLC2, 50 MHz
- 4MB RAM max: 16MB
- 64KB processor cache
- 3.5" 1.44MB diskette drive
- 120MB (19ms) hard disk
- 3 16-bit ISA slots
- Windows™ accelerator with 1MB video memory
- 14" VGA Color Monitor
- Slimline casing (3 x 3)
- MS-DOS® 6.0, Windows 3.1, mouse

$ 1,179

- 486DX, 33 MHz
- 4MB RAM max: 36MB
- 128KB processor cache
- 3.5" 1.44MB diskette drive
- 170MB (17ms) hard disk
- 2 VESA local bus slots
- Windows™ accelerator with 1MB video memory
- 14" SVGA LR Color Monitor
- MS-DOS 6.0, Windows 3.1, mouse

$ 1,539

Do-More Desktop

- 486 Blue Lightning, 66 MHz
- Upgradeable to Pentium technology
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 240MB (15ms) hard disk
- Onboard SCSI
- 5 16-bit ISA slots (2 VESA on local bus)
- Windows accelerator with 1MB video memory
- ★ 15" Flat Square LR color monitor, NI
- Network-ready (Ethernet 10BaseT)
- Desktop casing (5 x 5)
- MS-DOS 6.0, Windows 3.1, mouse

$ 1,979
(For 8 x 6 minitower, add $50)

Multimedia Minitower

- 486 Blue Lightning, 66 MHz
- Upgradeable to Pentium technology
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 440MB (12ms) hard disk
- Onboard SCSI
- 8 16-bit ISA slots (2 VESA on local bus)
- Windows accelerator with 1MB video memory
- CD-ROM drive
- Media Vision 16-bit sound card
- Stereo speakers
- ★ 15" Flat Square LR color monitor, NI
- Network-ready (Ethernet 10BaseT)
- Minitower casing (8 x 6)
- MS-DOS 6.0, Windows 3.1, mouse

$ 2,549

Pentium Processing Powerhouse

- Intel Pentium processor, 60 MHz
- 64-bit processor complex
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 540MB SCSI hard disk
- Onboard dual-channel fast SCSI
- 8 32-bit EISA slots (2 VESA on local bus)
- ATI Ultra Pro Mach 32, 2MB VRAM
- ★ 15" Flat Square LR color monitor, NI
- Desktop casing (8 x 6; convertible to minitower)
- MS-DOS 6.0, Windows 3.1, mouse

$ 3,999

SPECIAL OFFER: GET THE BIGGER PICTURE!

★ We're upgrading the view on every AMBRA model with a 66 MHz or Pentium processor — without raising the price! With these systems, instead of the standard 14-inch SVGA, you get a 15-inch Flat Square color monitor. At no extra cost. Limited-time offer. Call for details.

In Canada,[3] call 1-800-363-0066, ext. 872

CALL 1-800-252-6272, EXT.296

1-800-25-AMBRA

[1] Please call 1-800-252-6272 for details regarding AMBRA's money-back guarantee and limited warranty. On-site service may not be available in certain locations.
[2] Return shipping and insurance charges are the responsibility of the customer.
[3] Offerings may differ in Canada.

©1993 AMBRA Computer Corporation

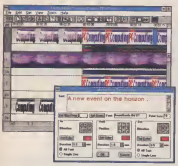
AMBRA is a trademark of ICPI Ltd. and used under license therefrom. The AMBRA logo and logotype are trademarks of AMBRA Computer Corporation. IBM is a registered trademark and Blue Lightning is a trademark of International Business Machines Corporation. Intel is a registered trademark and Pentium is a trademark of Intel Corporation. Microsoft Word, Money, Excel, PowerPoint, and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. All other product names are trademarks or registered trademarks of their respective suppliers. Offerings, prices and products are subject to change or withdrawal without prior notice. Prices do not include shipping.

Lights! Camera! Save as AVI! Slick Video Software Has Arrived

ALL THE TOOLS THAT FIT ATI's MedioMerge packs more into its first release than most people need. Those familiar with presentation programs will find the Storyboard Editor familiar;

it presents a slide-show overview (top screen), complete with transitions (of which there are, sadly, fewer than Adobe's Premiere provides).

Although the Storyboard Editor lets you add sound to your project, sound files are edited through the Scene Editor, which displays a time-line view of the audio and video elements (bottom screen). Double-clicking



on a sound wave allows you to edit sound files in a full-fledged sound editor. Clicking on a text icon brings up a text editor for animating titles using any font on your system.

THE WAIT IS over. You can finally make good use of all that multimedia presentation software and hardware: Adobe Systems and ATI Technologies have introduced Windows software packages that mix graphics, sound, and video files into slick video clips.

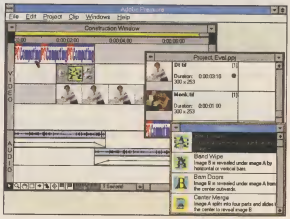
The two programs take different approaches to designing PC-based video clips. Adobe Premiere takes the one-application-fits-all approach and packs one main time-line screen with windows of all the functions you need. ATI's MediaMerge, meanwhile, has four modules with more functions and views than Premiere, although this approach occasionally sacrifices usability.

With both Premiere and MediaMerge you can blend WAV and MIDI sound files, most types of graphics files, and AVI and MOV video-clip files into cohesive videos that you can preview and save as AVI or MOV files using either Indeo or Microsoft compression. For professional sound, you can superimpose voice over music files and fade out background sound. You can even superimpose images over a background in a kind of "weather report" effect.

Adobe's Premiere for Windows

While Adobe's long-standing Mac version of Premiere is a professional tool, that's not the case for the Windows product. Premiere for Windows is a subset of Premiere for the Mac. You can't stack up 97 simultaneous tracks or use subpixel motion and field rendering, but this is really no great loss. You can import file directories at a stroke into your project file, and select clips from a thumbnail-view window.

Premiere's Construction Window contains three audio and three visual tracks, a manageable number that helps make the program easy to learn and use. When assigning one of the more than 30 transitions to a clip, you can preview the effect using the actual images. And best yet, Premiere uses Photoshop plug-in effects



Premiere packs a lot of video editing into a single Windows application, from audio fade-in and fade-out to splashy transitions between video and graphics clips (see lower right).

filters and exports to a file format that lets you use Photoshop to retouch video frames.

However, Premiere lacks some features you really do need, such as a titles editor. To add titles, you have to save text as a graphics file using other software.

Merging Media

MediaMerge inundates you with options. You can take two approaches to compiling clips: Use a thumbnail view or a Premiere-like Scene Editor. The Scene Editor has 16 tracks each for audio and visual information—more than you can see on any monitor and more than most people need. Thankfully, the top track is a composite view that helps you make sense of the individual components. Sound and title editors flesh out the package, as does a CD-ROM stuffed with useful raw materials.

The bottom line is that both products will get you started producing audiovisual clips. MediaMerge is packed with handy features, but it's cumbersome at times. You won't be sorry if you buy either, but Premiere has the usability edge.

MATTHEW LAKE

ADOBE PREMIERE • $295 • ADOBE SYSTEMS • (800) 833-6687, (415) 961-4400
Circle No. 613 on Reader Service Card

MEDIAMERGE • $299 • ATI TECHNOLOGIES • (416) 882-2600
Circle No. 614 on Reader Service Card

CITIZEN™

Your Notebook Printing Partner.

At home, at the office, or on the road, the Citizen Notebook Printer II works where you work.

With laser-quality text, graphics, and special-image color, the Notebook Printer II is your small-business printing partner.

The Citizen Notebook Printer II. It works where you work.

When we say Citizen works where you work, we mean it. On your desktop or on the road, the Notebook Printer II is the perfect companion to your PC. With its built-in, 5-page sheet feeder or optional 30-page sheet feeder and NiCad battery, you'll get laser-quality text and graphics wherever your work takes you. You'll also get two pages per minute output and Special-Image Color. All for a surprisingly low price.

Think of it. Now you can use your printer at your desk or in just about any location, use color when you need it, and produce professional-looking results. The Notebook Printer II really is the perfect PC companion. And all Citizen printers come with Citizen's two-year warranty and exclusive Service Select Program.™ For more information on the printer that works where you work, call 1-800-4-PRINTERS for a Citizen Notebook Printer II dealer near you.

CITIZEN™

The Notebook Printer II. It works where you work.

©1992 Citizen America Corporation. Citizen America Corporation, Citizen logo, The Citizen Notebook Printer II and Service Select Program are registered trademarks of Citizen America Corporation. Printer shown with optional 30-page sheet feeder

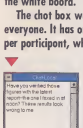
Circle 249 on reader service card.

TalkShow: Desktop Conferencing Minus the Goofy Cameras

PHONING HOME
TalkShow works best if you can arrange a conference call to supplement what you're seeing on the screen. If that's not possible (if you're dialing

the office from a hotel, for example), you need not sacrifice the chat. The Conference menu (top screen) hosts your log-in options and opens a chat box (bottom screen) that lets you make off-the-record comments to clarify anything you put on the white board.

The chat box won't suit everyone. It has one window per participant, which means



you can't easily read back the thread of a chat, and you can't save the conversation for later reference as you can with the white board.

DO YOU REALLY need to *see* co-workers to have a teleconference? When you're offsite and on deadline, wouldn't you rather just annotate their diagrams or layouts as they watch, then have them save your comments so there's no doubt about what to do?

TalkShow's onscreen white board is just that—a large blank area in which you can draw, type text, or import files. It serves as the conference forum, and the software's network and communications support enable people from the same building, an offsite office, or on the road to attend. Once all the "attendees" are online—a simple process of logging on via the Network Sign-in or Modem Dial-in options—you can load a text or image you're discussing onto the white board by pasting it from the Clipboard or using a limited Load Bitmap command.

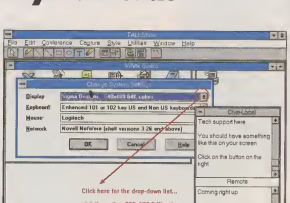
Once the object of your discussion is there for all to see, each participant can annotate it. Each person's notes are displayed in a different color so you can tell who wrote what.

Change your mind about your line of attack? You can remove all your comments with a single menu choice. Want to break for lunch, then resume? Just save the desktop.

TalkShow treads the fine line between depth of features and usability like a seasoned tightrope walker. Its paper-and-pencil metaphor makes it easy to use, although the program is complex enough to require a small learning curve.

The program's functions are laid out sensibly in their menus, and the toolbar (which many programs overload with cryptic icons) is as straightforward as you could wish. To make things even easier to learn, the cursor sprouts a help bubble as it passes over each button to tell you what it does.

If the object of your discussion was created in an object linking and embedding (OLE) server, you're in luck. TalkShow is an OLE client, so changes made on the fly will show up with minimal fussing on the part of the poor stiff who's doing your bidding. If the changes are minor, you can see them during the same session.



TalkShow's onscreen white board functions as your conference forum, and you can easily annotate text or images that are being discussed. The drawing tools are simple but effective.

This is, of course, assuming the file is small. Although the program compresses data before sending it across modem lines, we noticed annoying delays while the dial-in conference attendee was waiting for larger files to arrive—creating the kind of delay that leaves network attendees drumming their fingers and dial-in executives furious.

This doesn't have to be a serious drawback, however. The impact of TalkShow's pokey data transfer can be minimized by using only images of 256 or fewer colors—or using the "real thing" only during network-based conferences, when screen updates are faster.

It may not be a true teleconferencing tool, but TalkShow provides all you need without a huge price tag or the hidden costs of video hardware. For visual problems it's the next best thing to actually being there in person. If you'd rather pick up a pencil than a telephone to get your point across, TalkShow is that direct and interactive. And you can run it from a laptop in your hotel room—the perfect tool for executives on the road. **MATTHEW LAKE and JOANNA BAWA**

TALKSHOW • $398, TWO USERS; $995, FIVE USERS • FUTURE LABS • (408) 973-7228
Circle No. 615 on Reader Service Card

What! You Didn't Buy Those New Low Priced Modems From Hayes!

14,400 BPS + FAX144 As Low As $269

Scary thought, isn't it? Especially when you can get legendary Hayes reliability for as little as $79.

Introducing ACCURA™ – the modem for personal users, telecommuters, or anyone with a small office or home office. Send electronic mail. Access information services. Send and receive a FAX with more convenience and clarity, at a much lower cost, than any FAX machine. **Plus, ACCURA includes the new Smartcom® for Windows™ LE software as well as Windows FAX software.**

Choose from internal or external modems for your PC; externals for your Mac

Call us today at **1-800-374-8388**. In Canada, call **1-800-665-1259**. ACCURA modems won't come back to haunt you.

ACCURA 24B Internal	$79.00
ACCURA 24	$89.00
ACCURA 24 Mac®	$89.00
ACCURA 24B EC + FAX96 Internal	$119.00
ACCURA 96B + FAX96 Internal	$239.00
ACCURA 96 + FAX96	$269.00
ACCURA 96 + FAX96 Mac	$269.00
ACCURA 144B + FAX144 Internal	$269.00
ACCURA 144 + FAX144	$299.00
ACCURA 144 + FAX144 Mac	$299.00

Hayes®

Why settle for anything less? Hayes products have the computer world talking. More than ever.

Circle 162 on reader service card.

Go *Online with Hayes* BBS; call 800-874-2937 or 404-446-6336.

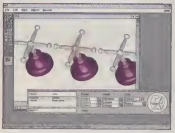
IMPROVING ESCAPE SEQUENCES

Hayes

©1993 Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348. Hayes, and the Hayes logo are registered trademarks and ACCURA, Smartcom, and the Hayes '302 Escape Sequence Patent icon are trademarks of Hayes Microcomputer Products, Inc. Other trademarks mentioned are trademarks of their respective companies. Prices are in U.S. dollars.

Finally, an Intuitive Approach to 3-D Modeling with MacroModel

MOVING AND SHAKING
Manipulating 3-D objects has never been this easy. MacroModel for Windows 1.5 makes the process of moving objects in a virtual work



space as simple as clicking on the designated object, in this case the center faucet handle, to first select it in the Object Browser and highlight it onscreen (top screen). You then swipe and type a new angle in the y-axis to determine the exact rotation of the handle (bottom screen). Notice that the

boxes next to the y- and z-axes are checked; this prevents the handle from rotating in either direction.

EVERYTHING CHANGES. In the past, if you needed to use a 3-D modeling package you were doomed to obscure interfaces, clunky object manipulation, and sluggish performance. MacroMedia has changed all that with MacroModel for Windows 1.5, possibly the easiest 3-D modeler and renderer you'll ever use.

The entire MacroModel package, from tutorial video to workbook manual to user guide, is well designed and executed.

Rich with Extras

But craftsmanship is only part of the picture; MacroModel also sports features and performance not found in most modeling packages. The program is a spline-based modeler, with accuracy to six decimal points, and it includes tools such as Sweep, Lathe, Extrude, Skin, and Cross-section for converting simple 2-D objects into 3-D objects. You also can deform 3-D objects using Twist, Bend, Taper, and Stretch tools.

MacroModel allows you to adjust the color, reflectance, and roughness of materials for the 3-D objects you create, either manually or by using predefined RenderMan materials, referred to as shaders. These shaders, which are actually mathematical descriptions of surfaces, are used with Pixar's RenderMan for Windows, a photorealistic rendering program bundled with MacroModel. (Unfortunately, only 17 shaders are provided.)

Typically, the toughest task in 3-D modeling is to quickly move objects or your viewpoint in the virtual work space. After all, you can't just grab an object and rotate it around its y-axis—or can you? MacroModel has browsers, which are floating windows, for real-time manipulation of objects.

MacroModel's default rendering mode is Smooth, based on Gouraud smooth shading. This is the preferred mode and works well with all but the largest models, where slow performance may prompt you to a use quicker rendering method.

MacroModel's Render Setup Screen allows you to have detailed control of the size of the rendered image, and provides you with rendering options and anti-aliasing settings.

The program imports AutoCAD's DXF files, Windows' Metafile and BMP files, and Encapsulated PostScript files. It exports DXF, Metafile, BMP, and RenderMan's RIB files, and you can import MacroModel objects into 3D Studio for animation. Other compatible products include the company's own Authorware Professional, Action, and MacroMind 3-D software, as well as Adobe Illustrator and Aldus FreeHand.

The Bottom Line

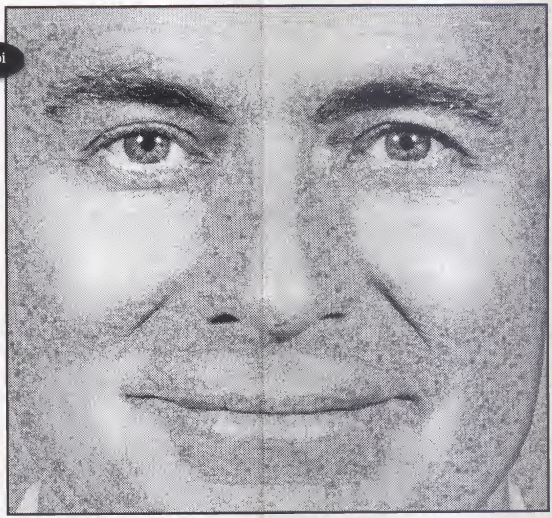
We ran MacroModel on a 486DX2-66 system with 16MB of RAM, a 24-bit color graphics card, and a 20-inch high-resolution monitor and found that the overall performance was good (MacroMedia recommends at least a 486DX-33 with 16MB of RAM).

MacroModel is a serious program that's relatively easy to use, although it's priced rather high, considering that it doesn't do animation or high-end rendering such as ray-tracing. Nevertheless, its smart interface makes it a great choice for anyone aiming for powerful 3-D modeling and above-average rendering. **ART LIDDLE**

MACROMODEL FOR WINDOWS 1.5 • $1,795 • MACROMEDIA • (800) 945-4061, (415) 442-2000
Circle No. 616 on Reader Service Card

Look

300 dpi



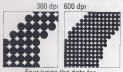
Details.

○ A job worth doing well is, well, worth printing right, great detail. ○ That's why you'll seek out 600-dpi higher-resolution scanned images ○ After all, you'll want to stand out in a sea of competing documents. ○ And printing a document right means printing with printing for sharper graphics. ○ Crisper type. ○ And

For even less.

Introducing the new 600-dpi HP LaserJet 4P printer. Priced to be your very own.

This comparison is no comparison at all. With HP's new LaserJet 4P you get 600 x 600 dots per inch. For noticeably crisper and clearer text and graphics. Now consider HP's microfine toner and Resolution Enhancement technology (which smoothes jagged edges), and you're experiencing truly superior output. And all for an exceptionally low price.



Four times the dots for better resolution.

The HP LaserJet 4P is redefining flexible paper-handling. Our newest flat-paper-path technology gives superior results on more paper types and sizes than ever before. Including mailing labels, 3 x 5 index cards, and postcards. Even envelopes print wrinkle-free.

To unleash your true personality, we've included 45 built-in typefaces. To save you money on toner, there's Economode for draft printing. The HP LaserJet 4P is loaded with 2 MB of standard memory with Memory Enhancement technology that actually works like 4 MB. And there's plenty of room to add memory, fonts and languages. So the right printer today is the right printer for tomorrow.

For Windows™ users, the HP LaserJet 4P printer has new Windows features built in for easier and more accurate Windows output. And, if you operate with Adobe's genuine PostScript™ software, there's the HP LaserJet 4MP printer, made to work seamlessly with your Mac.

When you consider HP's renowned quality and reliability, it's no wonder nearly 10 million LaserJets have been purchased worldwide.

Our free print samples will tell you the whole story. To get an even better picture of the new 600-dpi HP LaserJet 4P, and to pick up an actual print sample, visit your nearest Hewlett-Packard dealer. Or, call 1-800-LASERJET, Ext. 7624.[1] You can even call 1-800-964-0706 for a faxed data sheet.

If it isn't a LaserJet, it's only a laser printer.

HEWLETT® PACKARD

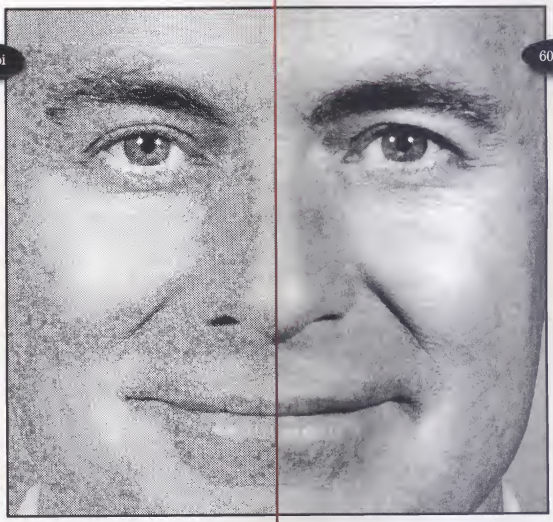
ew 600-dpi HP LaserJet 4P printer.
d to be your very own.

Windows is a trademark of Microsoft Corp. PostScript is a trademark of Adobe Systems Incorporated which may be registered in certain jurisdictions. [1] In Canada, call 1-800-387-3867, Ext. 7624.
©1993 Hewlett-Packard Company PE12381

Look *better:*

300 dpi

600 dpi



Details.

○ A job worth doing well is, well, worth printing right great detail. ○ That's why you'll seek out 600-dpi higher-resolution scanned images. ○ After all, you'll

○ And printing a document right means printing with printing for sharper graphics. ○ Crispar type ○ And want to stand out in a sea of competing documents ○

Introducing the new 600-dpi HP LaserJet 4P printer.
Priced to be your very own.

Presto! SnapGrafx's and Visio's Charts Take a Load off You

NEED TO STRING together a chart in record time? Micrografx's SnapGrafx and Shapeware's Visio 2.0 create all kinds of charts and diagrams on a dime.

Chart Automation

SnapGrafx focuses on automating the drawing of all kinds of charts—from organizational, target, and pyramid charts to checklists, time lines, and more. It's a breeze to learn and to use because you start from a template instead of a blank work area. You select the type of drawing you want to create from a gallery of 20 templates, and SnapGrafx presents you with a work space that includes a shape palette and placeholders for the elements of your drawing.

Intelligence is built-in: Shapes maintain their proportions when resized; an auto-fill feature completes series of dates in tables; and SnapGrafx automatically draws connecting lines in org and other charts.

Unfortunately, SnapGrafx's automation sacrifices on flexibility. For example, while a more sophisticated drawing program such as Visio lets you rotate shapes incrementally, you can rotate objects only 180 degrees in SnapGrafx. But the major drawback is that SnapGrafx saves drawings in a proprietary format, making it impossible to edit them in another program. SnapGrafx does act as an object linking and embedding (OLE) server, however.

Visio—One Step at a Time

Visio, on the other hand, which pioneered drag-and-drop drawing, starts you with a blank work space in which you build charts by adding one element at a time. Version 2.0 of Visio, meanwhile, offers a refined interface and improved control over shapes.

The improvements in Visio may be subtle, but they're significant. There are now two button bars: the alternate, which you access by clicking the right-mouse button, contains align, distribute, and corner and shadow style buttons. A click of the right-mouse button on your drawing calls up a menu of context-sensitive commands.

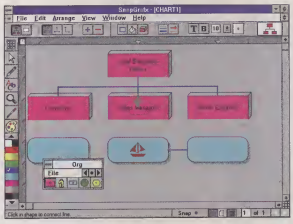
But the biggest improvement in Visio is the new connect-point tool. Connecting shapes in Visio was previously a manual task. The new connect-point tool lets you add or move connection points without going into ShapeSheets—windows that contain the geometric data for Visio objects—and you can now drag "smart" connectors across shapes in charts. Visio will also support OLE 2.0 as both a client and a server.

The Upshot

Despite sharing a similar drag-and-drop metaphor, SnapGrafx and Visio serve very different purposes. Having defined the product category, Visio is more powerful. The degree of control it affords and its wide variety of stencils make it the ideal choice for engineers, architects, and technical illustrators of all kinds. But if all you need to do is roll out snazzy charts on a deadline, SnapGrafx is the most automatic. ANITA DENNIS

SNAPGRAFX • $149 • MICROGRAFX • (800) 697-2610, (214) 234-1769
Circle No. 617 on Reader Service Card

VISIO 2.0 • $299 • SHAPEWARE CORP. • (800) 446-3335, (206) 467-6723
Circle No. 618 on Reader Service Card



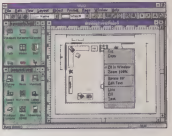
SnapGrafx automatically connects shapes in organizational charts. The anchor shown above denotes the origin and the sailboats identify connected positions in your chart.

DRAG AND DROP

Both Shapeware's Visio 2.0 and Micrografx's SnapGrafx make drag-and-drop drawing as easy as pie. SnapGrafx gives you chart templates, such as the circle/spoke chart shown in the top screen, as well as corresponding shape palettes.

Visio (bottom screen) starts you out with a blank screen—with a scalable grid for architectural drawing—and a collection of shapes. Just drag the shapes across the window and position them on the paper, and you're ready to roll.

Like SnapGrafx, Visio provides a hint line that displays a button or a menu



command's function, but in Visio you can also click on the right-mouse button for a menu of context-sensitive commands.

PENTIUM® TECHNOLOGY.

NOW.

$3,999.

HOW? AMBRA. WHAT MORE CAN WE SAY BESIDES "CALL SOON"?

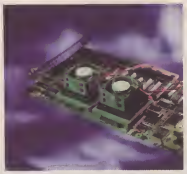
Computers powered by Intel® Pentium™ processors are here!
And a fast-moving company puts them directly within your reach, right now! We're AMBRA,™ a new IBM® subsidiary committed to bringing you the very latest — like full-fledged 64-bit Pentium technology — for less. We think you'll agree our specs and prices speak for themselves. Loud and clear.

Model DP60E/VL

- Intel Pentium processor, 60 MHz
- 64-bit processor complex
- 8MB RAM, max: 64MB
- 256KB processor cache
- 3.5" 1.44MB diskette drive
- 540MB SCSI hard disk
- Onboard dual-channel fast SCSI
- 8 32-bit EISA slots
- 2 local bus VESA slots
- ATI® Ultra Pro Mach 32, 2MB VRAM
- 15" Flat Square LR color monitor, NI
- Desktop casing (8 × 6; convertible to minitower)
- 200-watt autoswitching power supply
- MS-DOS® 6.0, Windows™ 3.1, mouse

$3,999

intel inside



Power times two — today and tomorrow.

AMBRA's dual-processor complex delivers double Pentium processor power in one computer — taking advantage of multi-processor support in such operating systems as UNIX® and Windows NT.®

AMBRA

Model TP60E/VL[1]

- Intel Pentium processor, 60 MHz; upgradeable to dual processors
- Dual 64-bit processor complex
- 16MB RAM, max: 128MB
- 512KB processor cache
- 3.5" 1.44MB diskette drive
- 540MB SCSI hard disk
- Onboard dual-channel fast SCSI
- 8 32-bit EISA slots
- 2 local bus VESA slots
- 1.25 S3 805 video accelerator, 1MB DRAM
- 15" Flat Square LR color monitor, NI
- Tower casing (8 × 12)
- 350-watt autoswitching power supply
- MS-DOS 6.0, Windows 3.1, mouse

$4,639

Complete customization.

The Pentium processor-based systems presented here are just the beginning of your choices with AMBRA. We custom-configure to your exact specs — preinstalling and/or preloading your pick of memory sizes, hard disks, option cards, and more — with no extra service charge and no delay.

Complete confidence.

AMBRA covers every computer with a 30-day money-back guarantee, and we've contracted with IBM to provide one-year onsite warranties.[2,3] You can count on expert technicians nationwide to deliver service within two days of your call, Monday through Saturday. And you can rely on toll-free technical support 24 hours a day, 7 days a week.

Complete convenience.

To get more information or place an order, just call. AMBRA's lines are open every weekday 8 am to 9 pm, and Saturday 10 am to 6 pm (ET). We accept American Express,® Visa® and MasterCard® — as well as purchase orders from qualifying businesses. So pick up the phone, and get a direct line to Pentium processing power today.

In Canada,[4] call 1-800-363-0066, Ext. 890

CALL 1-800-252-6272, EXT. 314

1-800-25-AMBRA

[1] FCC Class A system, for use in a commercial environment only. [2] Please call 1-800-252-6272 for details regarding AMBRA's money-back guarantee and limited warranty. Onsite service may not be available in certain locations.
[3] Return shipping and insurance charges are the responsibility of the customer. [4] Offerings may differ in Canada.

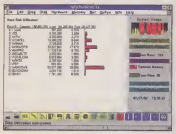
© 1993 AMBRA Computer Corporation. AMBRA is a trademark of ICPI Ltd. and used under license therefrom. The AMBRA logo and logotype are trademarks of AMBRA Computer Corporation. IBM is a registered trademark of International Business Machines Corporation. Intel is a registered trademark and Pentium is a trademark of Intel Corporation. MS-DOS and NT are registered trademarks and Windows is a trademark of Microsoft Corporation. All other product names are trademarks or registered trademarks of their respective suppliers. Offerings, prices and products are subject to change without prior notice. Prices do not include shipping.

Throw $49 into WinProbe, but Hang onto Your Common Sense

Trust It Only So Far

WinProbe provides copious amounts of information about your system and Windows environment, although its optimization capabilities are limited. Its clear onscreen

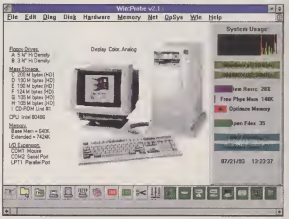
explanations are a big plus. For example, the top screen details WinProbe's results after it sniffed out all hardware interrupts. Beneath that list, WinProbe describes how to avoid IRQ conflicts. WinProbe also provides onscreen indicators showing the amount of available



memory and system resources (bottom screen). Strangely, though, the amount of memory and resources that WinProbe showed as available differed from the amounts reported by other programs.

First, the good news: For Windows probers and tweakers, WinProbe 2.1 from Landmark Research International is a bargain worth writing home about. The quantity and quality of its system diagnostic and reporting tools are upstaged only by its $49 price tag. Now the bad news: Like most of its ilk, the product is erratic and tough to trust completely.

In addition to its full tool chest and low price, WinProbe's most impressive offering is its memory-reclamation capability. It lets you reclaim memory that Windows applications use but don't properly make available when you're in another program. This utility helps you avoid system crashes and other problems caused by diminishing memory. If you use Windows products that hog resources, this feature alone is worth the price of admission.



WinProbe provides information about 1,000 elements of your hardware and operating environment, with clear onscreen definitions and descriptions of how to solve problems.

WinProbe also impressed us when we compared its diagnostic and reporting capabilities to those in the System Consultant utility included with Central Point's PC Tools for Windows (see New! February, page 38). WinProbe provides detailed information about 1,000 elements of your hardware and operating environment—far more than System Consultant. But WinProbe falls short of System Consultant in a few areas. For example, WinProbe lists the tasks to which all hardware interrupts are dedicated, but not the system elements, such as the BIOS or Windows kernel, that control the tasks.

WinProbe does provide lucid onscreen explanations for items such as hardware interrupts and describes how to deal with problems—such as IRQ conflicts—that those items can cause. And the program's other hardware reporting and diagnostic tools are particularly strong compared to those in System Consultant.

WinProbe's Windows optimization skills are neither as good as its diagnostic and reporting skills nor on a par with those found in WinSense from SoftLogic Solutions. Like WinSense, WinProbe recommends ways to optimize your SYSTEM.INI and WIN.INI configuration files and provides onscreen descriptions of its recommendations and how to implement them. However, WinProbe provides a maximum of only 35 optimization suggestions, while WinSense provides many times that amount.

One mistake WinProbe made: It falsely claimed that Word for Windows text and graphics conversion files referenced in our WIN.INI file did not exist. Had we followed WinProbe's suggestion to eliminate those WIN.INI lines, Word for Windows would have been unable to import files of different formats. WinProbe also claimed that it could not find files related to Windows' keyboard-repeat rate, although this is an assigned value, not a file.

As with other troubleshooters and optimizers, you can't believe everything WinProbe tells you; be particularly wary of its Windows-optimization suggestions. Still, its hefty number of diagnostic and reporting capabilities and its rock-bottom price make WinProbe worth owning for all but the most miserly Windows prober and tweaker.

DAVID HASKIN

WINPROBE • $49 • LANDMARK RESEARCH INT'L • (800) 683-6696
Circle No. 668 on Reader Service Card

New Version 2.0! Choose DOS or Windows.

"Hallelujah!" "QuickBooks is simple to understand and use." *Cynthia Krol, Accounting*

"Love it!" "Reports can be laid out in any conceivable way." *Susan Yeagley Sullivan, Psychiatric Management*

"Easy!" "I haven't used the manual since I installed it." *Timothy J. McManus, Campground Operator*

"Super-quick!" "A butt-kicking program! About time! Amen!" *Robert D. Pinson, TV Production*

Cynthia Krol
Westlake Village, CA

Timothy J. McManus
Lexington, MN

Susan Yeagley Sullivan
San Diego, CA

Robert D Pinson
Miami, FL

These people are all real QuickBooks users. (Thanks for all your comments and photos!)

Why is QuickBooks #1? Word of Mouth. It's the #1 selling bookkeeping software for small business people. It's the #1 recommendation from retailers. And most importantly, it's #1 with users.

Because QuickBooks® is so easy, you don't even need to know a debit from a credit. If you know how to write checks and invoices, you know how to use QuickBooks. Just fill in the familiar forms on the screen and it does all your bookkeeping for you. Invoicing and accounts receivable. Check writing and accounts payable. Plus all the financial reports you need to manage more profitably.

And it's fast. For instance, it finishes any repeat entry for you as soon as you start typing. Add QuickPay™ and you have complete payroll, too.

It's also easy to tailor QuickBooks to *your* business. Simply choose from a list of business types and then customize the settings and reports as much as you want.

"Extraordinarily easy to use, yet provides plenty of accounting power." PC Magazine

"QuickBooks is the easiest." New York Times

"A great program if you're more interested in running your small business than becoming an accountant." PC World

Now we'll look forward to hearing the word from you.

New Version 2.0! Choose DOS or Windows.

Try New QuickBooks For Only $8.00!

Pay only shipping and handling now to try QuickBooks. If you decide to keep using it after 30 days, pay just $99. Otherwise, it's yours free.

Call 1-800-624-8742

to order 24 hours a day, 7 days a week.

Add QuickPay to your order for just $59.95. (QuickPay not available in Canada.) Credit card orders only. Please have your card ready. Offer for first time users only. International shipping extra.

Expires 6/30/94 **Ad Code: FMBHK**

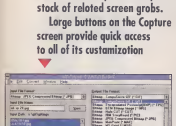
System requirements: **DOS:** IBM® compatible PC, 640K RAM, DOS 3.0 or higher, and 3.2 MB free on hard disk. **Windows:** IBM® compatible PC, 386 or higher, 2MB RAM minimum (4MB recommended), Windows 3.1 or higher, 8MB free on hard disk. QuickBooks is a registered trademark of Intuit. QuickPay is a trademark of Intuit. ©Intuit 1993

Two Full-Service Utilities Coddle Your Graphics Collections

STARS OF THE SCREEN
Other screen-capture programs look goofy when compared to Collage Complete. You can capture everything from whole screens and active windows to

active title and menu bars. Preview captures or send them straight to a file or printer; capture after a specified countdown or when you hit a hotkey; and increment numbers in filenames as you build up a stock of related screen grabs.

Large buttons on the Capture screen provide quick access to all of its customization



options, but they don't get in your way (top screen).

For its part, DeltaPoint's Graphics Tools' conversion process is the best we've seen. The conversion dialog box is well designed, with the input file format on the left and output format on the right (bottom screen). Just click for a drop-down list of format choices.

YOU'RE FRUSTRATED. YOU'VE bought everything you need to create and store 24-bit graphics—a hard disk, RAM, a Super VGA display, and a scanner. But nobody told you that using and keeping track of those files would be a full-time job. Two new all-purpose, under-$200 graphics utilities—DeltaPoint's Graphics Tools and Inner Media's Collage Complete—are poised to make your graphics life more productive.

Formats and Substance

Graphics Tools and Collage Complete have a lot in common. Both maintain catalogs of graphics in thumbnail views and both convert images between dozens of file formats. They also let you edit images and change sizes, resolutions, and color depths. Finally, you can scan images from TWAIN-compliant scanners using either program's Acquire command.

The two programs differ in feel and function. Graphics Tools offers more features by incorporating separate applications as menu options in its Media Manager catalog program. Want to convert a bitmap to a vector graphic or retouch a photograph? Pick a menu option from the Windows menu, wait for the application to load, and do your thing. The program even comes with a CD-ROM chock-full of vector-based clip art and photographic images. Graphics Tools' multiprogram approach lets you accomplish a great deal, although it often makes functions (most notably the Scan command) difficult to access.

By contrast, Collage Complete does image editing, file conversion, scanning, cataloging—everything except screen capture—in a few keystrokes and in one application, the Image Manager. Collage's file-management options are especially handy. You can move or delete files directly from the File menu—a real boon when you're on deadline—but its quick-and-easy interface lacks adequate photo-retouching tools, vector handling, and cataloging features for sound and motion files. Graphics Tools shine in these areas.

Neither product outdoes the current graphics-conversion champ, Inset Systems' HiJaak 2.1, which supports more file formats than the other programs. Graphics Tools, however, comes close: Its roster of supported bitmap, vector, and even fax file formats is extensive—and twice as long as Collage Complete's—and its batch-conversion process beats any that has crossed our hard disks at *PC/Computing*.

Another advantage of Graphics Tools is auto-tracing, which changes bit-mapped graphics to vector format. This makes images scalable, allowing them to be resized without generating stepped curves.

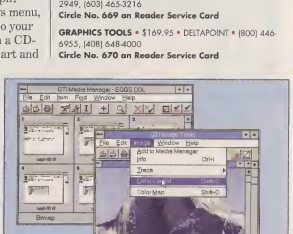
Decisions, Decisions . . .

Which should you buy? For sheer features and fine tools, you can't fault Graphics Tools—especially if you need to catalog faxes and vector images, convert lots of images, and perform advanced tasks such as color separation. Both products are outstanding.

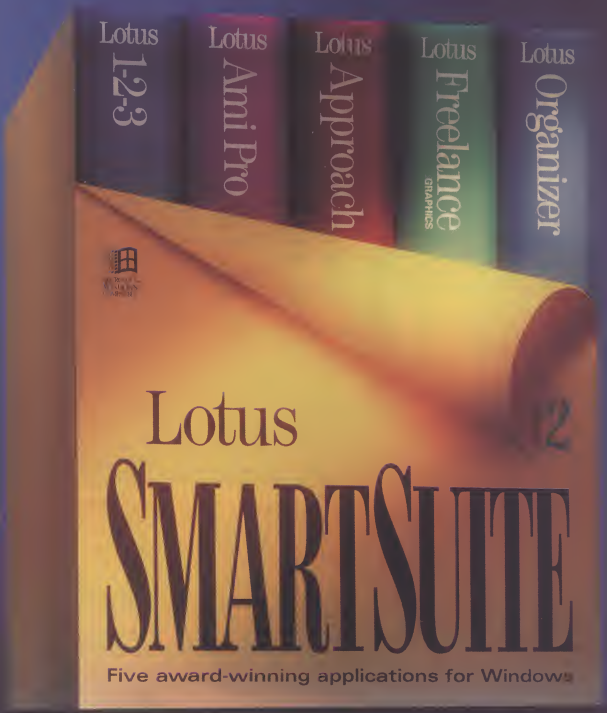
MATTHEW LAKE

COLLAGE COMPLETE • $199 • INNER MEDIA • (800) 962-2949, (603) 465-3216
Circle No. 669 on Reader Service Card

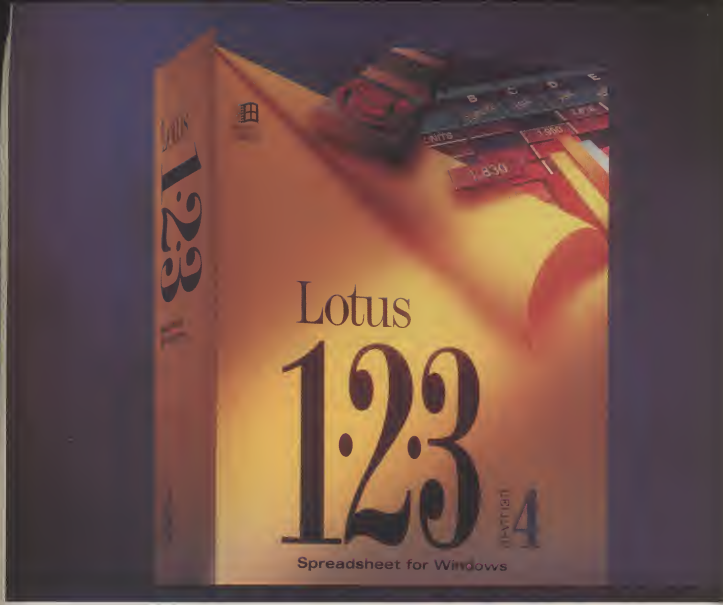
GRAPHICS TOOLS • $169.95 • DELTAPOINT • (800) 446-6955, (408) 648-4000
Circle No. 670 on Reader Service Card



DeltaPoint's Graphics Tools offers a plethora of tools for editing and organizing images, including catalogs of thumbnail views, an image-conversion application, and an auto-trace capability.



BEFORE YOU BUY YOUR WINDOWS APPLICATIONS, WE SUGGEST YOU GET A FEW QUOTES.

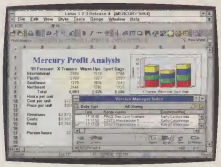


Thousands of DOS users who wouldn't move to Windows™ for Microsoft® Excel are jumping for Lotus® 1-2-3® Release 4. As are many who already use Windows.

And they're getting a spreadsheet that's not only much easier for them to use, but a lot more powerful in a lot of ways.

The new 1-2-3 is the first spreadsheet designed to help people work the way they want to work. Which is often together.

A raft of powerful new usability features makes 1-2-3 easy to learn and a pleasure to use. These include a context-sensitive user interface, A Live Status Bar, In-Cell™ Editing,



One-step charting. A completely new graphical interface for database queries. And Worksheet Tabs for 3D spreadsheets that make labeling and manipulating the work much easier.

The close integration of 1-2-3 with other Lotus Windows desktop applications lets you easily transfer 1-2-3 information, formats and processes to other applications where you need them. But it's the Version Manager and other Working Together® features that turn the 1-2-3 spreadsheet into a potent workgroup tool by letting people share and track information in new ways.

See for yourself. Visit your Lotus Authorized Reseller or call **1-800-TRADEUP, ext. 9093*** to upgrade for just $119 direct from Lotus. Or ask for a free demo disk. But first, turn the page and let's talk word processors.

Lotus
Working Together®

*In Canada, call **1-800-GO-LOTUS**. ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, 1-2-3 and Working Together

Windows Spreadsheet Ratings

"1-2-3 Release 4 ..... **7.8**"
"Excel Release 4.0 ..... **6.9**"
"Quattro Pro Release 1.0 ..... **6.5**"
InfoWorld 10/92, 8/93

"The SmartIcons in 1-2-3 for Windows are smarter and Lotus's approach to swapping different tool-bars in and out beats Excel's and Quattro Pro's."

PC/Computing 6/93

"1-2-3 LEAPFROGS EXCEL AND QUATTRO"

"Lotus's version manager blows away similar features in Excel and Quattro Pro."
Walter S. Mossberg,
Wall Street Journal 7/29/93

–*PC World* 6/93

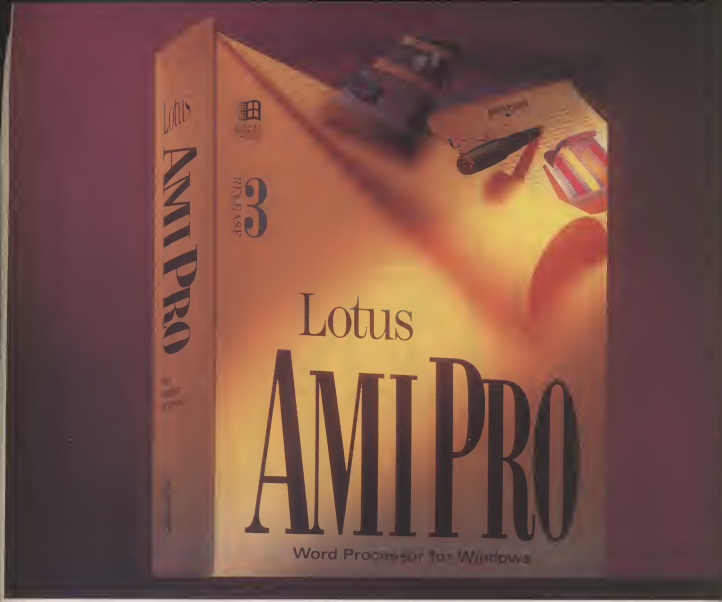
"Users who often collaborate on developing and refining worksheet data...will find Release 4 indispensable."

PC Week 5/3/93

"1-2-3 for Windows has always had more powerful database features than Excel or Quattro Pro and now these features are also easier to use."

BYTE 6/93

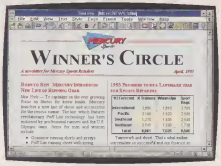
are registered trademarks and In-Cell is a trademark of Lotus Development Corporation. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corp



Software reviewers and industry experts have convincingly and consistently chosen Lotus® Ami Pro® as the best word processor over both Microsoft® Word and WordPerfect® for Windows.™

Again, in the August, 1993 *PC/Computing Face-Off*, Ami Pro soundly beat Word, and swept both DOS and Windows versions of WordPerfect in 8 out of 8 categories.

If you're in the least nervous about leaving WordPerfect, or think Word is the easiest way to face Windows, Ami Pro will feel like a breath of fresh air. Because no one comes close to Ami Pro for making even the most complex



documents fast and easy. Using customizable, editable SmartIcons® that give you one-click access to most tasks, and a SwitchKit that takes any trauma out of leaving WordPerfect, you'll understand why new Ami Pro users rarely bother to open the manual.

Then consider the advantages of Ami Pro's tight integration with 1-2-3® and the other Lotus applications. With Ami Pro, you can not only exchange data, charts and functions with the other applications in a click, you can easily create hot links between applications.

Enough words. Visit your Lotus Authorized Reseller or call **1-800-TRADEUP, ext. 9093*** to order. Or ask for your free, full featured working model. Meanwhile, how happy are you with your presentation graphics software?

Lotus.
Working Together®

*In Canada call **1-800-GO-LOTUS** ©1993 Lotus Development Corporation, 55 Cambridge Parkway Cambridge MA 02142. All rights reserved. Lotus, 1-2-3, Ami Pro and SmartIcons are regis-

"AMI PRO 3.0 TAKES THE LEAD OVER MICROSOFT WORD AS THE WINDOWS WORD PROCESSOR TO BEAT"

– *InfoWorld* 9/28/92

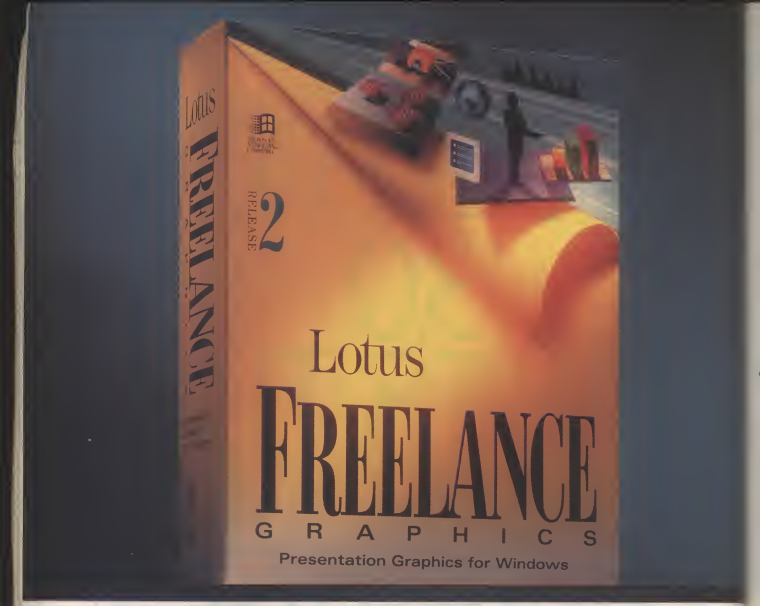
'Ami Pro 3.0 comes close to being perfect...It stands above Word and WordPerfect in both its function and its speed.'
Home Office Computing 1/93

'You can learn to use Ami Pro, the Lotus word processing program for Windows, in about a day. Put the manual in a drawer as a first step.'
Forbes 2/1/93

'Usability, features, and performance – Ami Pro is the overall winner.'
PC/Computing 8/93

'Users moving to Windows from DOS can fearlessly choose the latest Ami Pro Version.'
PC World 3/93

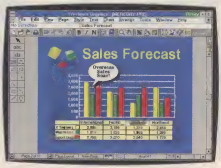
ademarks of Lotus Development Corporation. WordPerfect is a registered trademark of WordPerfect Corp. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corp



Year after year, Lotus® Freelance Graphics® has dominated both Harvard Graphics® and PowerPoint® in industry awards. This year, Freelance Graphics 2.01 has again set new standards, winning top ratings from InfoWorld, PC/Computing, BYTE and Windows Sources.

Historically, building professional looking presentations, even with the best software, has been time-consuming work. But with Freelance Graphics 2.01, it's so simple and so fast that people are now punching out charts for small presentations and even for hand-outs used at informal meetings.

One click is all it takes to access some of the most powerful features in Freelance



Graphics, like more than 65 SmartMaster™ design sets, 500 symbols and 100 chart styles. And when you're done, you can turn four-color overheads into black and white hand-outs with just one click.

The integration of Freelance Graphics with other Lotus applications is so complete that if you bring your 1-2-3® data into a Freelance presentation, and you later change a number in your 1-2-3 spreadsheet, it will be instantly reflected on the Freelance chart.

For your own live presentation, visit your Lotus Authorized Reseller. Or call **1-800-TRADEUP, ext. 9093*** for a free, full featured working model. By the way, have you ever used a database?

Lotus
Working Together®

*In Canada call **1-800-GO-LOTUS** #Holme

*1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge MA 02142. All rights reserved. Lotus 1-2-3 and Freelance Graphics are registered trademarks and SmartMasters is a trade

'Creating a presentation of even (100 slides) is absurdly easy - - and much easier in many ways than with competing products...'
PC Week 2/15/93

'Freelance is as close to presentation perfection as you'll find on any shelf.'
Windows User 8/93

"FREELANCE SCORED AN AWESOME 98.9 OUT OF A POSSIBLE 100... POWERPOINT 3.0 SCORED 83.6, HARVARD GRAPHICS 2.0 SCORED 80.4"

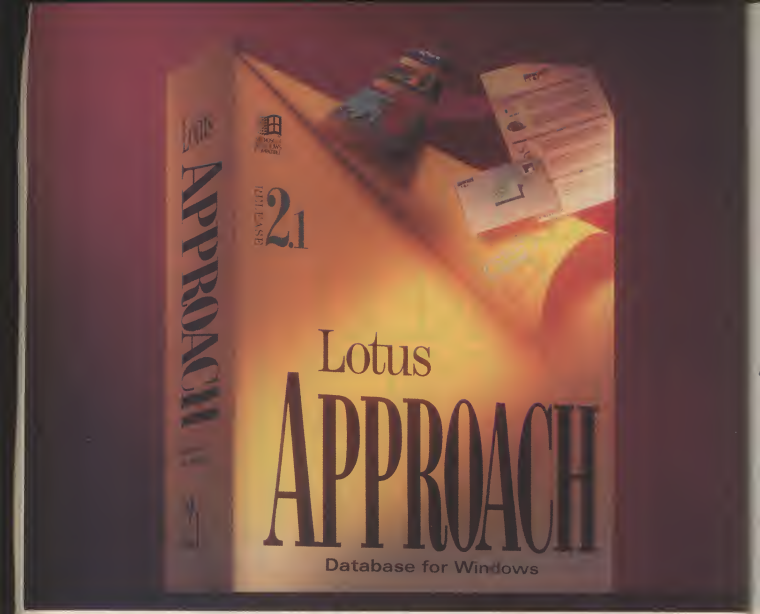
– *PC/Computing* 9/93

'Lotus Freelance Graphics
★★★★★
Microsoft PowerPoint
★★★'
Software Digest 7/93'

'(Freelance Graphics) outclasses the competition in features and ease of use.'
InfoWorld 6/21/93

'The users in this study were more productive, more effective, and more satisfied with Freelance Graphics than PowerPoint...PowerPoint users took 64% more time to complete their presentations.'
Usability Sciences Corp. 3/93

umber 6 issue of Software Digest Ratings Report.
Lotus Development Corporation. PowerPoint is a registered trademark and Windows is a trademark of Microsoft Corp. Harvard Graphics is a registered trademark of Software Publishing Corporation



Award-winning Lotus® Approach™ defines a whole new database category: the full powered client/server relational database for the general business PC user. No longer do you have to be a programmer, or think like one, to experience the everyday advantages of a relational database.

Now you, yes you, can build and use your own databases as easily as you build and use your own spreadsheets. For sales reporting, invoicing, project management, customer tracking, mailmerge or hundreds of other uses. Now PC users can enjoy easy, one-click, high-performance access to company data stored in all the major formats (including dBASE,® Paradox,® FoxPro,® Oracle® SQL, SQL Server and DB2®[1]) across all popular networks.

If you've never worked with a Windows™ database, or if you bought Paradox or Access only to find they were unworkable, Approach will change everything. An independent study found that Approach users are up-to-speed and producing real results in two hours.**

And because Approach is designed to share with other Lotus Windows applications, using Approach databases to mailmerge with Ami Pro,® to share data with 1-2-3® spreadsheets, or to simply report on data is something anyone can do.

What a difference a database makes. Visit your Lotus Authorized Reseller or call **1-800-TRADEUP, ext. 9093.*** Or get the whole suite and save a few hundred bucks.

Lotus
Working Together®

*In Canada, call **1-800-GO-LOTUS** **Market Probe International, May 1993 [1]Requires MicroDecisionware Gateway ©1992 by CMP Publications, Inc. 800 Community Drive
Windows is a trademark of Microsoft Corp. Approach is a trademark of Approach Software Corporation, a wholly owned subsidiary of Lotus Development Corporation. dBASE and Paradox are registered

"...Approach offers much easier-to-use database-creation tools for individual users and easier access to big-time databases than either Microsoft Access or Paradox/Windows...Approach is a big, big winner."
PC Week 6/28/93

"APPROACH... IS BOTH PRODUCTIVE AND HIGHLY USABLE.

"...Approach 2.0 is one of the few (software) packages...for which it's truly possible to never open the manuals."†
Windows Magazine 12/92

ACCESS WILL BE TOO OVERWHELMING FOR END-USERS..."

–*InfoWorld* 1/17/93

"Best Buy Approach is the simplest and most straightforward relational database."
PC World 6/93

"The most usable Windows relational database ever."
PC/Computing 8/93

hassett, NY 11030 *1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge MA 02142 All rights reserved. Lotus, 1-2-3 and Ami Pro are registered trademarks of Lotus Development Corporation
demarks of Borland International, Inc. FoxPro is a registered trademark of Fox Holdings, Inc. Oracle is a registered trademark of Oracle Corporation. DB2 is a registered trademark of International Business Corp.

The new Lotus® SmartSuite™ 2.1 is the most complete desktop solution for Windows™ users. It brings together 1-2-3® Release 4, Ami Pro® Release 3.01, Freelance Graphics® Release 2.01, Approach™ 2.1 and Organizer™ 1.1 at an irresistible price (upgrade for just $299***). But it's much more than a deal on an all-star collection of Windows applications.

The applications in SmartSuite 2.1 are closely integrated, sharing a consistent appearance and behavior. This reduces the time it takes for a user to learn each application. For example, the three most used applications in SmartSuite share 26 common SmartIcons® (In Microsoft® Office, they share 3).

Far beyond anything possible with Microsoft Office, Lotus's integration also simplifies the process of switching between applications, sharing information across applications and using functions from one application while working within another.

For example, you can easily edit 1-2-3 charts from within Freelance Graphics. Or use Freelance, or 1-2-3 functions within Ami Pro. All work easily with the Approach database. And all support industry standards, so they'll work with offerings from other vendors as well. This makes working in each application, and the entire Windows platform, easier and more productive than ever before.

Lotus SmartSuite also includes a personal information manager, the award-winning Lotus Organizer.

SmartSuite is also designed for working in groups in ways Microsoft Office can't. All applications are network ready and mail-enabled with ccMail™. The results of Working Together® are easily manageable through 1-2-3's Version Manager. And each application features additional enhancements for full integration with Lotus Notes.***

Unlike Office users, SmartSuite users can call a single toll-free number for support.

For the whole story, visit your Lotus Authorized Reseller. Until 12/31/93, you can upgrade from any Lotus or competitive product to SmartSuite 2.1 for just $299.*** Or for a SmartSuite demo disk, call **1-800-TRADEUP, ext. 9093***.

"LOTUS SMARTSUITE REDEFINES HOW APPLICATIONS SHOULD WORK TOGETHER."

"Lotus now has a top rated product in each of a half a dozen categories... Moreover, Lotus products have come to share a great deal of genuine integration..."
*Soft*Letter* 5/21/93

"When you buy...SmartSuite, the pieces really work together!...The point: There's more to a suite than cramming four boxes into a suitcase and cutting the price."
PC/Computing 8/93

—*PC Letter* 6/7/93

"The level of integration in the SmartSuite makes complicated, cross-application tasks easier for users and lets them take full advantage of...the Windows environment."
Dataquest 6/15/93

Lotus.
Working Together™

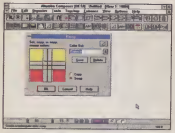
*In Canada, call **1-800-GO-LOTUS** **Consult your Lotus Representative for more information on how to incorporate Lotus Notes and ccMail into your communication strategy. ***$299 direct from Lotus. Offer expires 12/31/93.
Qualifying competitive products are Microsoft Excel, Borland Quattro* Pro (text including SE) Microsoft Word, WordPerfect, Wordstar* DeskWrite* Microsoft PowerPoint, Harvard Graphics Corel Draw WordPerfect Presentation, Aldus* Freelance, Qualifying Lotus products include 1-2-3 (excluding 1-2-3 for Home) Symphony Ami Pro Freelance Graphics, ccMail and Graphwriter* Lotus Notes and Graphwriter are registered trademarks and SmartSuite and Lotus Organizer are trademarks of Lotus Development Corporation. ccMail is a trademark of ccMail Inc. a wholly owned subsidiary of Lotus Development Corporation. Quattro is a registered trademark of Borland International Inc. Wordstar is a registered trademark of Wordstar International Inc. Deskwrite is a registered trademark of International Business Machines Corp. Aldus is a registered trademark of Aldus Corporation

Heads Up, Photoshop—Altamira's Composer Does Splashy Graphics

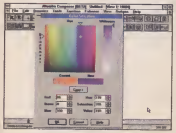
NEW TWIST, OLD THEME

What's a ramp? Composer's conventions may not be familiar to nongraphics professionals, but the functions and interface are remarkably easy to learn.

To create a color gradient, or *ramp*, choose Tools, Patterns, Ramp, or click on the Ramp



button in the Patterns swap button set. The dialog box that pops up shows four color swatches in a square, separated by a cross of gray buttons (top screen). Here you can choose a defined color set, or copy and swap colors by clicking on the gray bars. To change colors, just double-click on the swatch and pick a new



color from the Color Selection box (bottom screen).

When you've chosen your colors, click on OK, draw a box with the mouse pointer, and the ramp appears.

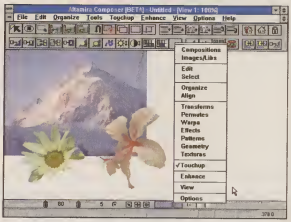
THE IMAGE-EDITING war is getting as fierce as a dogfight. The new pup on the block, Altamira's Composer, offers design professionals an easier way to create graphic images. Even Adobe's Photoshop—the longtime star—doesn't go in as many directions as Composer.

Composer's strength lies in its flexibility. Assembling a composite from individual images is incredibly easy in Composer because you can drag and drop image selections as if they were objects. In traditional image-editing programs, once you paste a selection into an image it becomes a permanent fixture. Composer gives each bit-mapped image its own mask, or layer, so that a moon pasted down in a scanned photo of the sky can be repositioned or rotated at will, for example.

You can stack, group, and manipulate images with dozens of tools, including the Transforms, Permutes, Warps, Effects, Patterns, Geometry, and Textures tools. Touchup and Enhance tools let you apply colors, soften and sharpen images, and adjust hue, saturation, brightness, and contrast levels. You can create new images by cutting existing ones with the Spline tool or by selecting colors with the Color Lift tool. Composer allows for safe experimentation because you can play with copies of images without affecting the originals.

The program's savvy interface contributes to its usability. A particularly intelligent design feature is the group of "swap" buttons: The 13 left-most buttons on the lower toolbar can be swapped between several color-coded sets of buttons with functions that mirror Composer's menu structure. Just click and hold the right mouse button on any of the swap buttons to choose the set you want from a pop-up list.

Still, Composer isn't for the faint of heart. It doesn't always use familiar terminology, which can lead to confusion. For example, instead of closing an image when you've finished with it, you click on the Delete



Composer lets you use sophisticated tools such as the ones shown in the screen above, and we found it very usable in spite of its occasionally confusing terminology.

button or choose Edit, Delete to remove the image from the screen. You have to be careful, however, because clicking on the Delete Image File button in the Compositions swap bar or choosing File, Images, Delete Image will delete the file.

Composer supports TIFF, Targa, JPEG, BMP, and Pixar formats. It also imports Kodak PhotoCD images and supports TWAIN-compliant scanners. You can store images in libraries for later use. The program does require a powerful system: Altamira recommends a 486 with 8MB of RAM, a 100MB hard disk, and a display capable of showing 32,000 (16-bit) colors. We found that we needed at least a 33MHz 486DX with a 24-bit-color card.

With a list price of $795, Composer also takes a toll on your wallet, although it's priced slightly lower than the $895 Photoshop. Composer lacks Photoshop's prepress capabilities, but it supports Photoshop plug-in modules. Composer won't completely replace Photoshop—lack of color separation is a serious omission—but its object-oriented image-editing capability makes it a great complement. **ANITA DENNIS**

ALTAMIRA COMPOSER • $795 • ALTAMIRA SOFTWARE CORP. • (415) 332-5801
Circle No. 671 on Reader Service Card

FINALLY, there's a place for people like *BOB KESWICK.*

A guy like Bob gives you his card. A card for some reason you want to hang on to. So what do you do? Probably throw it in that business card graveyard you've got going in the back of your desk somewhere.

Which is exactly why we came up with CardGrabber™. It's a quick, painless way to transfer all the information from business cards into a convenient database.

Start with our tiny, palm-sized scanner. One that's plug and play, so it connects directly to your desktop or notebook computer, without requiring some kind of surgery to install extra hardware.

In a flash, a business card is scanned, and all information is automatically entered into the appropriate lines of an address book.

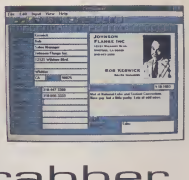
Then, by either the card image or name, you can customize it. Search it. Rearrange it. Or import/export to just about any conceivable PIM or database.

So you can start turning those business cards into something else. Business leads.

Pick up the phone and call us at 714-261-6444. Or contact one of your local resellers.

And suddenly, Bob's business card will be just like Bob.

Tough to lose.



CardGrabber

THE BUSINESS CARD SCANNER

Circle 256 on reader service card. Come see us at Fall/Comdex Booth# Sands 4353

PACIFIC CREST TECHNOLOGIES, INC.

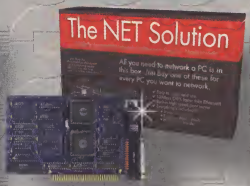
CardGrabber is a trademark of Pacific Crest Technologies, Inc © 1993 Pacific Crest Technologies, Inc.

The NET Solution™

New breakthrough LAN offers higher performance, with much less complexity, at a lower cost.

Easy to Install and Use

- No switches or jumpers to set.
- No on-site technical staff or contractors needed.
- Fits right in with your existing PCs, software, *and people.*



12 Mbps

- Faster than ARCnet *and* Ethernet!
- Built-in high-speed print server.
- Up to 254 users possible.

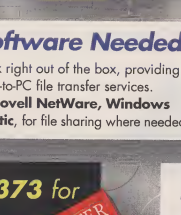
No Network Software Needed

- Intelligent cards form a network right out of the box, providing printer sharing, E-Mail, and PC-to-PC file transfer services.
- You may also use a NOS like **Novell NetWare, Windows for Workgroups**, or **LANtastic**, for file sharing where needed.

Uses UTP wire, but no hub is needed!

- Uses the popular *unshielded twisted-pair* wire (only one pair!).
- Simple daisychain-style wiring.
- Optional hub available if you want a star topology.

*Call **800-433-5373** for more information. A FREE handbook on networking is also available.*



If you think the Mac and Windows made computing easier, you should see what this does for networking!

CONNEXPERTS
The connectivity experts...

Galleria Tower One
13355 Noel Road, Suite 1600
Dallas, Texas 75240 USA
(214) 233-8800
FAX (214) 239-6490

©1993 by Applied Creative Technology, Inc. CONNEXPERTS is a registered trademark and NET Solution is a trademark of Applied Creative Technology, Inc. Other product names mentioned herein have been used for identification purposes only and may be trademarks of their respective companies

Circle 257 on reader service card.

Harvey Mackay's Sharkware: The First Celebrity PIM?

THINK ALL PIMs are alike? Sharkware, a new Windows personal information manager from CogniTech, is looking to separate itself from the horde of similar offerings. Sharkware incorporates the advice of success maven Harvey Mackay, author of several best-selling books including *Swim with the Sharks without Being Eaten Alive*. The promise is that unlike other PIMs, Sharkware provides a proven system, not just a framework for your own (presumably) untested method.

Time Is Money

Mackay's success notions are built around time and contact management, which makes the tie-in with a product like this a natural. His system is integrated into Sharkware in a number of ways. The most important facet is probably the Mackay 66, a 66-field contact profile screen based on Mackay's work. In addition to name, address, and phone, the profile includes fields for data on hobbies, business objectives, education, special interests, and so on. The thinking is that the more you know—or have your PC remember—about a contact, the more easily you can develop that relationship. You can also choose profiles with 33, 22, or 12 Mackay-based fields or define your own.

Also included are online tips and quotes from Mackay covering career, sales, time management, and a slew of other topics. The advice and philosophy is hardly groundbreaking stuff, but the books have been undeniably popular. Still, one of the strengths of Sharkware is that if you don't want the Mackay-isms, you don't have to use them.

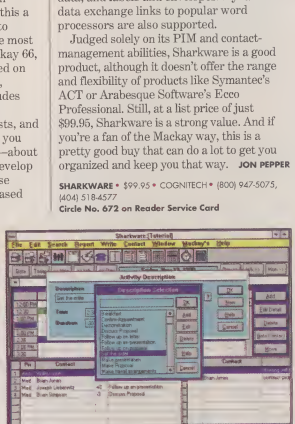
Without them, you still have very credible software that combines plenty of useful tools, and the Mackay profiles certainly form a good set of contact data. Sharkware supports an unlimited number of contacts, lengthy notes on any contact, and has plenty of features you would expect from a quality PIM. There's an autodialer, call logging, pop-up boxes with standard responses to minimize typing, a search tool, and the ability to view activities on a daily or weekly basis.

Made for Mackay Fans

The integration in Sharkware is impressive, and gives you the ability to link your appointments, calls, and to-do items to any contact. Other useful features include drag-and-drop scheduling, the ability to prioritize to-do lists and phone calls, and rollover of uncompleted activities. Plus, you can output several different reports, contact data, and labels and envelopes. Dynamic data exchange links to popular word processors are also supported.

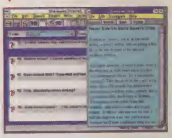
Judged solely on its PIM and contact-management abilities, Sharkware is a good product, although it doesn't offer the range and flexibility of products like Symantec's ACT or Arabesque Software's Ecco Professional. Still, at a list price of just $99.95, Sharkware is a strong value. And if you're a fan of the Mackay way, this is a pretty good buy that can do a lot to get you organized and keep you that way. **JON PEPPER**

SHARKWARE • $99.95 • COGNITECH • (800) 947-5075, (404) 518-4577
Circle No. 672 on Reader Service Card



CogniTech's Sharkware package incorporates success tips from Harvey Mackay and has a snappy Windows interface, with usability extras including drag-and-drop scheduling.

SELLING TO A BARFLY?
Some clients just won't cave in until they've tossed back a Long Island Iced Tea or two.



Sharkware is designed to help you remember who those clients are, and it stores a whole range of other unexpected, but potentially sale-saving tidbits. The program helps you build a profile of contacts via questions and answers relating to lifestyle, professional habits, strong opinions, and other idiosyncrasies. For road warriors who live in meetings, the resulting database could become a real asset over time. Just think how happy you'll be when your notebook PC reminds you that the last time you met with so-and-so he spilled red wine all over you and stuck you with the dinner check.

On the downside: If you have a small base of contacts, you're likely to remember most of the information you'll be keying in anyway.

Apple's System 7 and SNA•ps are trademarks of Apple Computer, Inc.

"Since my Mac's tied to an AS/400, I'm free to do anything."

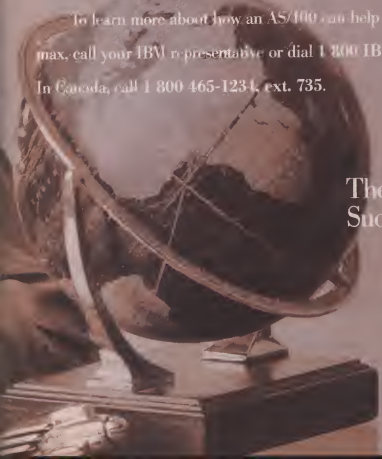
A new world is opening up for Macintosh users everywhere—thanks to the IBM AS/400.

With an AS/400 as your server, you'll have access to the information you need to be more productive. Whether you're running a single Mac with Apple's System 7 or an AppleTalk network with a hundred nodes, you'll retrieve data companywide through SNA·ps 5250—and view the results graphically.

The AS/400 has the scalability to grow as you grow, with maximum main storage of a whopping 1.28GB. Plus 20,000 proven business applications from which to choose. And industrial-strength systems management for superior backup, data protection and more.

There's virtually no learning curve for the AS/400, because it integrates data seamlessly into applications you already know. And for reliability, you can't beat the AS/400, with hundreds of thousands of systems installed and running.

To learn more about how an AS/400 can help take your Mac to the max, call your IBM representative or dial 1 800 IBM-CALL, ext. 102-2. In Canada, call 1 800 465-1234, ext. 735.



The IBM AS/400.
Success Isn't Complicated.

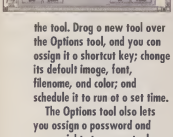
IBM

WinTools 1.1—Not Just Another Boring Windows Shell

PICKINESS AND PRIVACY
WinTools' network customization options are extensive. The common denominator here, as everywhere in this shell, is

the tool. Drag a new tool over the Options tool, and you can assign it a shortcut key; change its default image, font, filename, and color; and schedule it to run at a set time.

The Options tool also lets you assign a password and access rights to a new tool. Restricting rights affects how a tool can interact with the set of Basic Tools. For instance, a



check by the Options dialog box's Trash tool permits users to delete a new tool. A check by the Size tool enables resizing or repositioning.

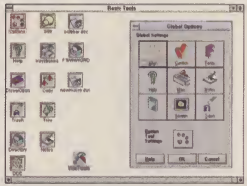
IF YOU HAD to describe Tool Technology Publishing's WinTools 1.1 in one phrase, it would be *Windows without frames.* WinTools is a shell that does two things: It breaks down Windows' rigid boundaries, and frees icons from Program Manager's restrictive conventions.

Instead of a mess of program groups and application icons, WinTools uses a single graphic device—an icon called a tool. Tools can represent anything you make of them—an executable file, a data file, a directory, or a storage space to hold other tools.

To get you started, the product has 12 basic tools, including Tree, Directory, DDE, Options, Desk, Notes, and Copy. Creating additional tools is simple.

To round out the offerings, WinTools also provides an effective icon manager called Imagemaker, and an application scheduler that lets you start, stop, and restart apps automatically. And Big Sky, a task manager, handles up to 64 virtual desktops.

WinTools' capabilities really shine in the office environment. You can limit an individual user's rights to WinTools,



Check out WinTools' tool icons—they can represent not only documents and applications, but directories and nested groups of tools as well.

individual storage spaces (called tool sets), or specific tools. Each tool has 15 definable parameters per user.

Our verdict: What WinTools brings to Windows is flexibility—and where do you need it more?

BARRY BRENESAL

WINTOOLS 1.1 • $149 • TOOL TECHNOLOGY PUBLISHING • (800) 793-3701, (415) 459-3700
Circle No. 619 on Reader Service Card

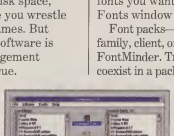
FontMinder Wins Back Time and Disk Space

SO MANY FONTS, so little disk space. Too much type can sometimes be too much of a good thing—fonts hog disk space, slow performance, and make you wrestle with long lists of typeface names. But FontMinder 2.0 from Ares Software is a clever Windows font-management utility that comes to the rescue.

Just tell FontMinder which fonts you want to use—whether they're TrueType or PostScript—and the program not only manages the changes in WIN.INI and ATM.INI, but determines which printer and rasterizer they go with and if they are printer- or driver-resident.

The drag-and-drop interface makes managing fonts easy. Font families are listed in the master font library: Click and drag the fonts you want to use to the Installed Fonts window and save that configuration.

Font packs—fonts grouped by project, family, client, or any way—are at the heart of FontMinder. TrueType and PostScript can coexist in a pack, and you can associate a pack with any filename.

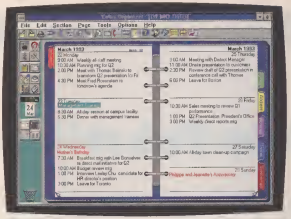


In FontMinder, just click and drag the fonts or font packs you want to use to the Installed Fonts box.

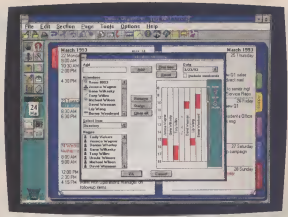
FontMinder doesn't tax your wallet or your system. It costs a mere $79.95 ($29.95 to upgrade) and needs only 2MB of RAM. That's not a king's ransom for an end to your type troubles.

ANITA DENNIS

FONTMINDER 2.0 • $79.95, OR $29.95 TO UPGRADE • ARES SOFTWARE • (800) 783-2737, (415) 578-9090
Circle Reader Service No. 620

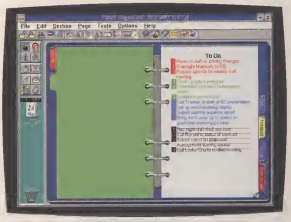


With Organizer, you can change the format of your calendar as you work: view it by day, by week, or even two weeks.

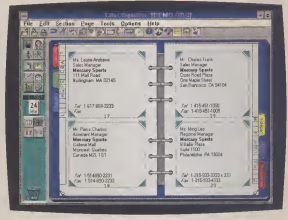


Lotus Organizer with group scheduling makes it fast and easy to set up a meeting among a large group of people—no matter where they're located.

So, what does your day look like?



The To-Do section lets you prioritize tasks as you enter them and view entries by due date.



Sort your address book in any of four formats: name, company, zip code and type of record. An Auto Dialer lets you simply drag and drop to dial a number through your modem.

If you're like most business people, it's not a pretty picture.

Unless of course, you've chosen to use Lotus Organizer.™ As an on-screen calendar, to-do list, yearly planner, address book, notepad and anniversary reminder, Lotus Organizer could very well bring the order and efficiency you demand in your life. (Not to mention the sanity.)

ORGANIZER 1.1 NOW WITH GROUP SCHEDULING WITH VI-MAIL

Like a traditional planner, it works in familiar ways with named tabs for each section and pages that actually turn. But unlike any traditional planner, it allows you to do so many things you've never been able to. Like link entries stored in different sections, virtually any way you want. Plus, you can customize Organizer by renaming tabs, changing colors, and creating sections as you need to.

To remind you of an upcoming commitment, Organizer sounds an alarm at a pre-set time. It can also schedule your meetings, carry overdue tasks forward from day to day and, of course, print pages in formats to fit popular manual organizers.

So if you'd like to increase your productivity, efficiency and control over your daily business life, call Lotus at **1-800-872-3387, ext. 9034.** Or take a little time and visit your Lotus Authorized Reseller.

How's this afternoon look?

Lotus Organizer

In Canada, call **1-800-GO-LOTUS.** ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus Organizer is a trademark of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation.

EYE-POPPING MULTIMEDIA TO GO . . .

A Movable Feast—

STEROID LAPTOP
Engineering is like democracy: It's the art of compromise. The Toshiba T6600 CDV gets a gold star for its design choices. Foremost is its weight: only 20 pounds. *Only 20?* Yup: It's 4 pounds lighter than the others—and you'll feel the difference after hauling it around all day. We also prefer its clamshell design to the upright cases of the others. Keyboard travel was uniform and pleasant to use, and it was the only one we would feel comfortable carrying around; the other two are too deep and stick out too far from your body for comfortable hand carrying.

What would we change? Improve the sound card to make it work with DOS, boost its performance a touch by increasing the caches, and drop its price by $1,000. Then we'd be as happy as clams.

LIKE WILLIE NELSON, you're on the road again. But you aren't singing—you're selling. Your tools are your silvery tongue, persuasive arguments, and a hot presentation you spent the last six months perfecting. A multimedia presentation extraordinaire.

To play it, you've been lugging around a desktop PC (where else can you get the speed you need?), a CD-ROM drive (for late-night changes), and speakers. The fact that you need a small moving van to get your presentation from here to there hasn't escaped you. Here's your answer: a portable multimedia PC.

So that you don't get stuck with a turkey, we selected three top machines for evaluation: Dolch Computer Systems' Mach M486-66C, Lightning Computer's ThunderBox 486/66VLE Portable, and Toshiba's T6600 CDV.

You'll find the best blend of features in the Toshiba T6600. The Lightning ThunderBox offered the best performance by a hefty margin, and it has the lowest price to boot—but the screen was too small and dim for our taste. The Dolch Mach didn't do well in our performance tests, but we loved the modular design: You can increase the size of the box until you have room for seven ISA slots.

Weighing In

Although portable, the systems aren't light. The lightest—the Toshiba T6600—weighs in at 20 pounds. The Lightning ThunderBox tips the scales at 24 pounds and the Dolch Mach at nearly 25 pounds.

Much of the Dolch Mach's weight is due to its innovative case design. It measures 7 by 11 by 16 inches. The ThunderBox is 8 by 9.75 by 16.5 inches; both have black, upright cases. You fold down the keyboard to reveal the monitor, which you then tilt up for viewing.

The Toshiba T6600 (4.75 by 12.75 by 15.5 inches) uses a standard clamshell design that we liked immensely. It opens like any laptop (although heaven forbid you should put this 20-pound, 5-ounce beast onto your lap), and it presents you with its 10.4-inch active-matrix color monitor (as does the Dolch Mach). From a purely aesthetic point of view, the Toshiba T6600 is a bit easier on the eye than the other two systems because it's platinum instead of black.

Of the three systems, the Dolch Mach has the most interesting enclosure: It's a modular design. You start with two ISA slots and can add extensions to the case to increase the number of slots to seven—and the total weight to more than 30 pounds.

The base Lightning ThunderBox has—brace yourself—six EISA slots. That's right: EISA, not just ISA. If you tire of toting this system, use it as a network server.

Sights and Sounds

The Toshiba T6600 and Dolch Mach both employ 10.4-inch active-matrix color monitors. They're crisp, clean, and big enough for most everything. The Mach we tested had brightness and contrast controls that made the screen easy on the eye. In addition, Dolch included its PitViper video-capture board.

The Toshiba T6600 came with only one monitor control (unlabeled) that did almost nothing to adjust the brightness or contrast

WEIGHT UP!
On paper, the Dolch Mach M486-66C looks like a great system. It's expandable and has all the right components. But at nearly 25 pounds, it's heavy and unwieldy. Fortunately, Dolch includes a beautiful shoulder bag to help forestall just such complaints. The main problem with the Mach isn't its design or performance—it's the over-$12,000 price.

for the Senses

of the monitor—a shame. For its part, the Lightning ThunderBox uses a 9.4-inch active-matrix color monitor that is dark and small and has no brightness control.

Open the Lightning ThunderBox and the Dolch Mach, and you'll find Media Vision's well-regarded Pro AudioSpectrum 16 sound card. The Toshiba T6600, on the other hand, comes with Microsoft's Windows Sound System integrated on the motherboard. In ZD Labs' tests of both cards, we got better sound from the Lightning ThunderBox and the Dolch Mach.

The Lightning ThunderBox doesn't come with integrated speakers. That's a serious shortcoming for a portable multimedia PC. The Dolch Mach and the Toshiba T6600 both include good-quality speakers, but when we turned up the volume on the Dolch Mach, it produced a continual hiss and would noticeably clip all the sounds it produced, making it unenjoyable.

Pedal to the Metal

All three systems came with 66MHz i486 CPUs and Toshiba Model 3401 dual-speed CD-ROM drives, but they didn't behave like it. When we started running benchmarks, the ThunderBox immediately pulled out in front. Why? Cache and memory. Inside you'll find 1MB of cache on the motherboard (four times more than in the other systems), 16MB of main memory (the others had 8MB), and a CorelSCSI host adapter with 4MB of cache. With all that cache and memory, it's no surprise this system was so much faster.

Our Wintest benchmark, which includes typical Microsoft Word for Windows and Excel operations, showed the ThunderBox to be only 20 to 30 percent slower than our baseline desktop system, a Dell Dimension XPS 466V—impressive for a portable. The other systems were up to 47 percent slower.

But if you want to use the Lightning ThunderBox to run DOS applications, you're in luck. It was up to 66 percent faster than the desktop Dell.

When we tested the CD-ROM drives, all the systems were faster than the rated 300 kilobytes per second. Despite its high performance, however, we had repeated problems trying to reboot the ThunderBox using Ctrl-Alt-Del. Frequently the system's monitor wouldn't turn on or the system would hang.

Who Wins?

In price and warranty, the Dolch Mach was the heavyweight. Its $12,536 price makes it over $3,000 more than the Toshiba T6600 ($9,499) and nearly $6,000 more than the Lightning ThunderBox ($6,755). The Mach's warranty was similarly hefty: two years parts, one year labor, and limited onsite service are standard. The Toshiba T6600 has a one-year parts and labor policy, and the Lightning ThunderBox offers a standard two-year parts and labor coverage with onsite service for $100 extra per year.

Again, our pick is Toshiba's T6600 for its balance of price, performance, weight, and video quality. The Mach is just a little slower, a little heavier, and too expensive. If you still can't cough up the money for the Toshiba T6600, the Lightning ThunderBox makes an admirable companion. When Lightning revamps the video subsystem in the ThunderBox and adds speakers, it will be truly top-notch.

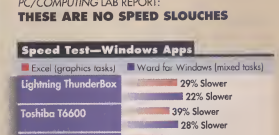
JOHN MONTGOMERY

DOLCH MACH M486-66C • $12,536 • DOLCH COMPUTER • (800) 538-7506, (408) 957-6575
Circle No. 621 on Reader Service Card

THUNDERBOX 486/66VLE PORTABLE • $6,755 • LIGHTNING COMPUTER • (800) 347-4486, (415) 543-3111
Circle No. 622 on Reader Service Card

TOSHIBA T6600 CDV • $9,499 • TOSHIBA • (800) 253-5429, (708) 541-9400
Circle No. 623 on Reader Service Card

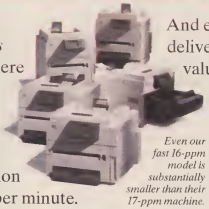
PC/COMPUTING LAB REPORT:
THESE ARE NO SPEED SLOUCHES



LIGHTNING FAST
You want fast? You got it: a portable that can rival a top-of-the-line desktop system. Lightning really strikes a responsive chord with the ThunderBox 486/66VLE Portable: great performance and a remarkably low price. The only complaints we have are its lack of integrated speakers and its small 9.4-inch monitor. Once Lightning fixes these two limitations, it can concentrate on trimming down the case.

Why you should stop buy
And start buying IBM

If you buy HP® LaserJet® printers because you've *always* bought HP LaserJet printers, here are five compelling reasons to change your ways: the IBM® LaserPrinter 4039 family by Lexmark. It's a fully compatible series of full-function printers—10, 12 and 16 pages per minute.



Even our fast 16-ppm model is substantially smaller than their 17-ppm machine.

And even the least expensive 4039 delivers big-printer features and value some LaserJet printers leave out.

PostScript® compatibility is standard on every model. So is a clear, simple LCD control panel. And support for options like networking.

Investment protection. *Upgradable code, interchangeable options and common supplies give the LaserPrinter 4039 family flexibility HP just can't match.*

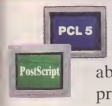
Lexmark's optional LAN cards support flash memory—something HP doesn't offer. And every 4039 printer includes auto emulation switching and triple hot ports.

The speed you need. *Unlike HP LaserJet printers, IBM LaserPrinter 4039s give you a full range of full-function models—10, 12 and 16 ppm. You never pay for more than you need.*

The Energy Star emblem does not represent EPA endorsement of any product or service. Print speeds rated at 300 dpi. 8 ppm maximum at 600 dpi. Comparisons based on MBTPs. Dealer prices may vary. IBM is a registered trademark of International Business Machines Corporation in the U.S. and/or other countries and is used under license. HP, LaserJet and PCL are registered trademarks of Hewlett-Packard Company. PostScript is a registered trademark of Adobe Systems Incorporated. Lexmark is a trademark of Lexmark International, Inc. © 1993 Lexmark International, Inc.

THE IBM LASERPRINTER 4039

ing laser printers by habit.
laser printers by Lexmark.



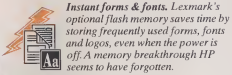
HP makes PostScript a $775 option. But we're PostScript and PCL® 5-compatible, at no extra cost.

flash forms and duplexing. Plus family-wide expandability and upgradability, to protect your investment.

Lexmark is the independent, worldwide company formed from a division of IBM. And dedicated to listening to what customers want, bringing it to market fast, and backing it with quality, support and responsiveness.

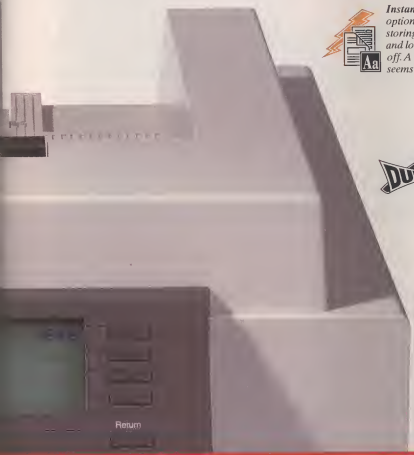
For your Lexmark dealer, call 1 800 358-5835 (in Canada, 1 800 663-7662). And see the printers with the choices and the value traditional HP buyers have traditionally been missing.

One more feature Lexmark builds in family-wide, and HP doesn't.



Instant forms & fonts. *Lexmark's optional flash memory saves time by storing frequently used forms, fonts and logos, even when the power is off. A memory breakthrough HP seems to have forgotten.*

Two-sided printing. *An automatic duplexer attaches in seconds to any LaserPrinter 4039 model. Delivering two-sided printing for as little as half HP's price.*



IBM Personal Printers by

LEXMARK™

Make Your Mark

Circle 226 on reader service card.

FAMILY, BY LEXMARK. PRINT SMART.

Fast Rainbows: Number Nine Does True Color at Warp Speed

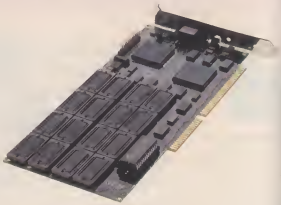
BIG, FAST WINDOWS

Number Nine's GXE Apex board includes some great Windows configuration utilities for fine-tuning. The Resolution Exchange utility lets you visually select the colors and the resolution, then restarts Windows so that the changes take effect.

You can also select the virtual-desktop resolution and expand the size of your Windows desktop to resolutions of up to 2,048 by 2,048, regardless of what your monitor supports. Your monitor then becomes a viewport on a larger desktop that you can pan with your mouse—great for displaying large spreadsheets or for running two full-sized applications side by side.

You can also select the ideal refresh rate for your monitor, and position the image onscreen. We think all video cards should include this type of utility.

FASTEN YOUR SEAT belts. The race for fast, true-color Windows just got more exciting—and affordable. Competing with the likes of high-end true-color card makers SuperMac and Matrox, Number Nine's newest graphi accelerator for Windows, the GXE Apex, is not only one of the fastest high-resolution Windows accelerators but also one of the fe that can splash up to 16.7 million colors on your screen at resolutions as high as 1,152 by 870 pixels. Impressed? It also costs less than $900.



Number Nine's GXE Apex board flew through our speed tests and costs less than $900.

Want to See It Again?

The first thing you'll notice when you drop the GXE Apex into your system is that it's fast—*really* fast. Based on the same S3 806C928 accelerator chip that powers its cousin, the $595 Number Nine GXE accelerator, the GXE Apex comes with 4MB of onboard VRAM. In our applications tests, the ISA version of the board proved to be twice as fast as Matrox's $995 Impression 1024 card and faster than SuperMac's $949 Spectrum/24 while displaying 16.7 million colors (24-bit color) at 1,024-by-768-pixel resolution. Only Matrox's 3MB $1,299 MGA Impression beat it. The GXE Apex even proved faster than most Windows accelerators running the same 1,024-by-768 resolution with just 256 colors.

The GXE Apex supports a range of colors and resolutions, including 16 colors at 640-by-480 resolution, 65,536 colors at 1,280-by-1,024, and 16.7 million colors at 1,152 by 870 or 1,024 by 768. It also handles the 1,600-by-1,200 resolution used for document imaging—although you'll be hard-pressed to find monitors that support this high resolution. But even at 1,280 by 1,024, the onscreen image is rock solid—the Apex supports flicker-free refresh rates of 72Hz and higher at resolutions up to 1,280 by 1,024.

The GXE Apex's installation software is also first rate. In less than 10 minutes, we had the board unpacked, installed, and running.

Software Smarts

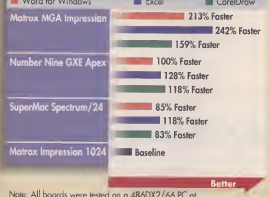
The GXE Apex also comes with Number Nine's suite of software utilities so that you can get the most from your board. The Resolution Exchange utility lets you quickly and painlessly select the resolution, color depth, and system font size you want.

Two other utilities allow you to temporarily disable the virtual resolution using a hotkey combination and to automatically determine where dialog boxes will appear on the virtual desktop. A monitor-adjustment utility lets you position the image onscreen and adjust the display refresh rate to reduce screen flicker—a feature we'd like to see on all video cards.

Taken together, the GXE Apex's graphics utilities, performance, and range of supported resolutions and colors make this board one of the best in its class. If you want the fastest true-color card around, it's Matrox's $1,299 MGA Impression. But for fast high-resolution true color at a great price, there's no contest—get the GXE Apex. **WENDY TAYLOR**

GXE APEX • $895 • NUMBER NINE COMPUTER CORP. • (800) 438-2739, (617) 674-0009
Circle No. 624 on Reader Service Card

PC/COMPUTING LAB REPORT:
MATROX'S COSTLY IMPRESSION WINS



Note: All boards were tested on a 486DX2/66 PC at 1,024-by-768-pixel resolution with 16.7 million colors.

STARTING UP WITH NORTON UTILITIES IS LIKE BRUSHING YOUR TEETH. IF YOU DON'T DO IT EVERY DAY, WELL, YOU GET THE IDEA.

PC MAGAZINE EDITORS' CHOICE
Sept. 14, 1993

No, Norton Utilities™ 7.0 will not reduce ugly tartar buildup. But using it on a daily basis will virtually eliminate any chance of losing your important files, regular or compressed.

On start-up, our improved Norton Disk Doctor™ will automatically detect file system problems and fix them in seconds. And the new Norton Diagnostics™ will test all of your vital hardware components. Meanwhile, Speed Disk™ will optimize disk performance and improve your chances of recovering any lost data.

You also get nine other automated repair functions designed especially for compressed data problems.

If you'd like more detailed information, dial FAX 1-800-554-4403, select option 1 and request document 447. Better yet, pick up a copy of the latest version of Norton Utilities at your nearest reseller. Then go ahead and take "prevent data loss" off your list of things to do today.

By the way, don't forget to floss.

THE NORTON UTILITIES
SYMANTEC.

For information in Europe, call 31 71 454111. Australia, 61-2-879-6577. Canada 1-800-667-8861. Elsewhere outside U.S., 408-252-3570. The Norton Utilities and Norton Disk Doctor are registered trademarks and Norton Diagnostics and Speed Disk are trademarks of Symantec Corporation. The names of other products are trademarks or registered trademarks of their respective holders. PC Magazine Editors' Choice copyright 1993 PCMG. The Norton Utilities Version 7.0 ©1993 Symantec Corporation. All rights reserved.

Circle 143 on reader service card.

CypherScan Is a Slick, All-in-One Business-Card Scanning Solution

THE PORTABILITY PLUS
Yes, you can get a dedicated card scanner if you want, but CypherScan leverages your existing scanning hardware. If you have a TWAIN-compliant flatbed scanner, you can slot as many as eight cards into a template and enter cards in batches. If you have a hand

scanner, you can use a different template to keep your scans straight and true.

The biggest plus is that if you have a notebook and a parallel-port scanner that does TWAIN, such as the hand scanners from Mustek and Logitech, you can take card scanning on the road and to trade shows, where you really need it. This portability, combined with CypherScan's robust searching and reporting, give the product the edge over Micratek's Scan-in-Dex (see New! October, page 44).

THE ROLODEX IS dead. Long live CypherScan. If you have a TWAIN-compliant scanner, you're less than $200 away from turning your disorganized flood of incoming business cards into useful, retrievable information. And if you don't have a scanner, you'll be happy to hear about the less-than-$400 price tag for a specialized scanner-and-software solution.

CypherTech's CypherScan products scan business cards; recognize the text; parse the information into name, address, phone number, and other crucial fields; and give you most of the tools you need to search and retrieve a contact's information. If you're loaded with more contact information than you can handle, this is a great way to manage it. If you're already using software such as Act, Organizer, or another contact manager, this is the ideal front end for adding new cards to your contact database.

OCR That Works

The process for adding cards is simple. Feed a card into the special scanner or lay several flat on the platen of your existing flatbed model, click on the software's scan button, and wait. If you nurse a healthy mistrust of OCR, you have your pick of checkpoints—you can read over each data field as you scan, compare the text with the scanned image of the card, or zoom in on parts of the scan you can't read. This makes the inevitable—but surprisingly few—OCR errors easy to correct. Misplaced data is also surprisingly rare—but to move a name or number from the notes field to the correct slot is a simple drag-and-drop job.

Not Your Only Option

Compared with its major competitor, Microtek's Scan-in-Dex, the CypherScan has distinct advantages. It contains more contact-management features, such as multiple views of a client's information, including home address, notes fields, and important numbers (phone, fax, cellular phone, e-mail, and other user-defined fields). It also enables you to do a fuzzy search on any of the pertinent fields. Furthermore, the software can generate quick-and-dirty hard-copy reports, including a phone list or set of mailing labels—a huge boon.

The CypherTech and Microtek solutions aren't alone, though—the field of business card scanning is burgeoning fast. Six months ago, there was no such animal to automate data entry. You'd use scanners and OCR software that didn't fit the format, then enter the results in your contact manager. This was clearly a waste of effort.

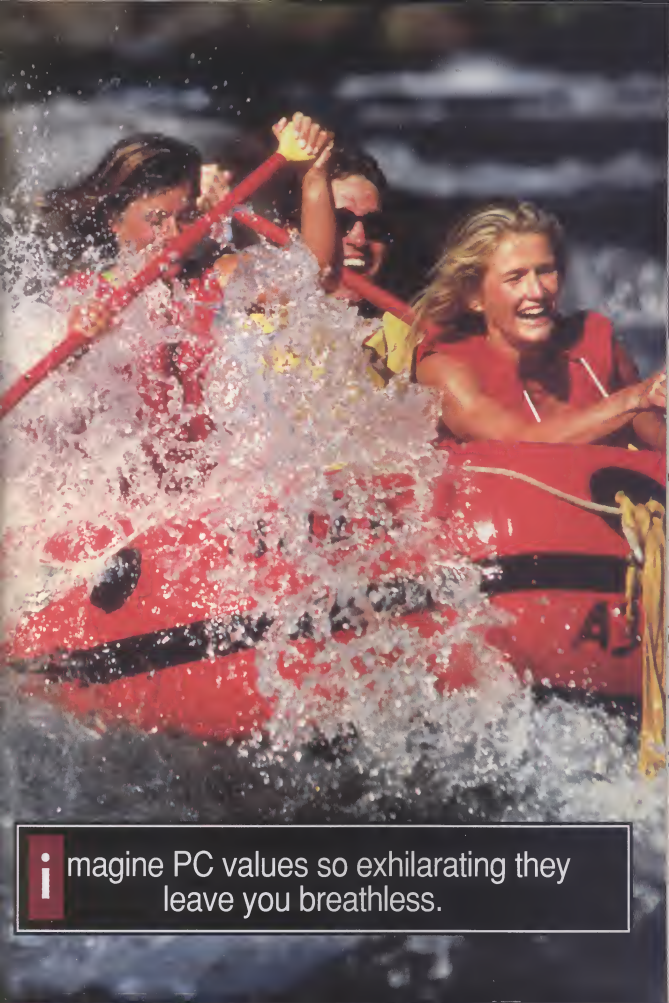
By the time you read this, in addition to the CypherTech and Microtek offerings, two more companies will have introduced card-scanning alternatives. Cognitive Technology Corporation (415-925-2367) takes the same approach as CypherTech's flatbed scanner software: It piggybacks existing hardware. Pacific Crest (714-261-6444) packages a parallel port scanner called CardGrabber with OCR, relational database management, and links to third-party personal information managers. We'll round up all the business-card scanning solutions in an upcoming issue.

For now, we're most impressed with CypherScan. Despite a rather cluttered interface, the CypherScan software comes out tops when compared with its competition. Get one now and trash your Rolodex.

MATTHEW LAKE

CYPHERSCAN LINE • $145, HAND SCANNER SOFTWARE; $245, FLATBED SCANNER SOFTWARE; $395, SOFTWARE AND SCANNER BUNDLE • CYPHERTECH • (408) 734-8765
Circle No. 625 on Reader Service Card

Getting information from CypherScan's business-card database is a point-and-click operation—click on icons on the right to navigate information.


imagine PC values so exhilarating they
leave you breathless.

Introducing a *new* family a *new* 3-year warranty

The DECpc™ LPv. Outstanding value in a low-profile package

The brand new, value-priced DECpc LPv personal computer is just what you're looking for in budget-conscious performance. It puts exciting second-generation Windows™ acceleration into a basic, low-profile package. And like all our PCs, it's backed by Digital's outstanding new 3-year warranty.*

- i486™ processors
- Local bus GUI accelerator with 1 MB video RAM
- 170 MB hard drive
- 4 MB RAM
- 4 drive bays
- 14" SVGA(i) monitor
- 3 ISA slots
- MS-DOS® 6.0 and Windows™ 3.1

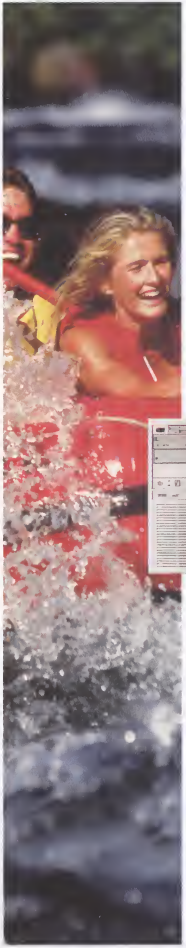
intel inside

MICROSOFT WINDOWS READY-TO-RUN

Call today for latest prices!
1-800-210-1401

imagine a new family of PCs that gives you And unsurpassed peace of mind.

* 3-year limited hardware warranty. Certain restrictions and exclusions apply. Warranty service on DECpc notebooks is return-to-factory. Monitors, batteries and peripherals covered by a 1-year limited warranty.



Give your users a thrill. Make a big splash with management.

Only Digital — the new power in PCs — can give you the performance that users crave, a price that won't leave you high and dry, *and* the peace of mind you get with top-quality worldwide support.

You'll always get cutting-edge performance from a Digital PC.

Would you expect any less from one of the world's biggest, most experienced computer makers? Digital brings you a long line of high-performance PC products that include Pentium and I486 processors, built-in local-bus acceleration, second-level caching, certification for leading PC networks, and lots of other power-user features. Plus room for growth: plenty of option slots, drive bays, ZIF OverDrive sockets, and more to keep you up to speed.

intel inside

pentium PROCESSOR

Choices that make your life easier.

Whether you're upsizing or downsizing, Digital gives you one of the industry's broadest ranges of PCs — and all the extras that you need.

Here's our list: six notebooks, nine value-priced desktops, five microtower desktops, five mini-servers,

three servers, and more. We also have a full selection of the industry's best printers, network equipment, the latest MS-DOS and Windows applications and other options. There's even a variety of leasing and payment plans to suit your needs.

imagine a new power in PCs: performance, price,

# of value-packed PCs, and on every Digital PC.

The DECpc LPx. Value-priced performance

The DECpc LPx is an exceptional value at a no-compromise price. It will thrill you with a choice of graphics performance, based on VESA-VL bus Windows acceleration– plus more expandability to protect your investment far into the future. And like all Digital PCs, our 3-year warranty* covers it, too.

- i486 processors
- VESA-VL bus GUI accelerator with 1 MB video RAM
- 4 MB RAM
- 170 MB hard drive
- 5 drive bays
- 6 ISA slots (including 2 VESA-VL slots)
- 14" SVGA(i) monitor
- Upgradeable with the Pentium™ OverDrive™ processor
- MS-DOS 6.0 and Windows 3.1

Please reference BJL when you call.
8:30 a.m. to 8:00 p.m. Mon-Fri ET.
Or call your local Digital dealer or value-added reseller.

PUTTING IMAGINATION TO WORK

awesome value.

digital™

Call Digital for all your PC needs.

There's simply no other name you need to know.

Call Digital directly or call your local Digital dealer or value-added reseller. Both know your PC and service needs and can provide you with whatever you need . And either way, we'll put the Digital Peace of Mind Promise to work for you. To help keep your operation flowing smoothly along.

The Digital PEACE OF MIND Promise.

We promise to keep you on the cutting edge of PC performance.

We promise you will always get outstanding value for your money.

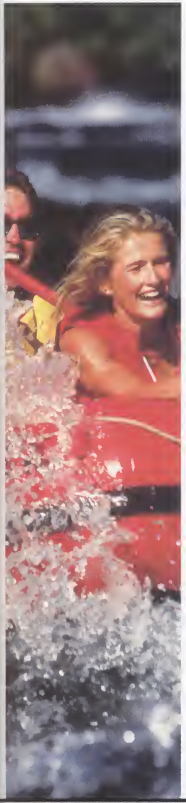
We promise you hassle free buying.

We promise you world-class design and manufacturing quality.

We promise you unsurpassed support, starting with our 3-year warranty.

Call 1-800-210-1401

Please reference BJL when you call.
8:30 a.m. to 8:00 p.m. Mon-Fri ET.
Or call your local Digital dealer or value-added reseller.



A new 3-year warranty smooths out the bumps.

Digital now offers a three-year warranty on all our PCs that's backed by our own factory-trained service experts. That's how sure we are of the quality and performance of our PCs. And when you need service, *we* come to your site, we don't send a third-party vendor. We have over 30,000 service employees, worldwide, whose job is to help make your life easier. And we can custom-tailor a warranty extension or support package for your site.

Quality that makes the others look all wet.

Expect the best-built PCs in the business. We're experienced computer builders, and we know just how tough the workplace can be on a PC. Which is why we build little details like metal SIMM clips and card cage reinforcing bars into our PCs. Why we ensure every Digital PC is built to ISO 9000/MRP II Class A quality standards. Test them until we're sure they can measure up to *your* tough standards. And we even give you a 30-day money-back guarantee.

PUTTING IMAGINATION TO WORK

and peace of mind.

digital™

Performance, price and peace of mind from the new power in PCs.

	PROCESSOR/PRICE	PACKAGE INCLUDES:
SL NOTEBOOKS	**Modular notebooks that let you upgrade processors, disk drives, screens and more.**	
	• 25MHz i386SL (mono) $2,149 • 25MHz i386SL (passive matrix color) $2,699 • 25MHz i486SL (mono) $2,499 • 25MHz i486SL (active matrix color) $3,999 • Lease far as low as $75/Manth	• 4 MB RAM • 64 KB cache • 120 MB removable hard drive • 2 PCMCIA slots • 4 MB RAM • 120 MB removable hard drive • 2 PCMCIA slots • 3.5" floppy drive • Pre-installed MS-DOS 6.0/ Windows 3.1 • BitFAX/BitCOM software • 6.5-hour NiMH battery • AC adapter • Snap-on trackball
LPv SYSTEMS	**Outstanding value in a low-profile package.**	
	• 25MHz i486SX $1,348 • 33MHz i486SX $1,448 • 33MHz i486DX $1,698 • 50MHz i486DX2 $1,898 • 66MHz i486DX2 $2,098 • Lease for as low as $47/Manth	• Local bus SVGA video • GUI accelerator • 4 MB RAM • 1 MB video RAM • 170 MB hard drive • 3 ISA slots • 4 drive boys • 3.5" floppy drive • 14" SVGA(i) color monitor • Microsoft's Ready-To-Run MS-DOS 6.0/Windows 3.1 • Mouse • 101-key keyboard
LPx SYSTEMS	**Value-priced performance and expandability.**	
	• 33MHz i486SX $1,598 • 33MHz i486DX $1,848 • 50MHz i486DX2 $2,048 • 66MHz i486DX2 $2,248 • Lease for as low as $56/Manth	• VESA-VL bus GUI accelerator • 4 MB RAM • 1 MB video RAM • 170 MB hard drive • 6 ISA slots (2 VESA-VL slots) • 5 drive bays • OverDrive Processor upgrade • Pentium™ OverDrive Processor upgrade • 3.5" floppy drive • 14" SVGA(i) color monitor • Microsoft's Ready-To-Run MS-DOS 6.0/Windows 3.1 • Mouse • 101-key keyboard
MTE SYSTEMS	**The only desktop PC you can get with both EISA and VESA-VL buses.**	
	• 33MHz i486DX $2,898 • 66MHz i486DX2 $3,298 • Lease for as low as $102/Manth	• 6 EISA slots with 1 VESA-VL • Local bus SVGA video • GUI accelerator • 8 MB RAM • 128 KB cache • 1 MB video RAM • 245 MB hard drive • 5 drive boys • 3.5" floppy drive • Pentium OverDrive Processor upgrade • 14" SVGA(i) color monitor • Video adapter • Microsoft's Ready-To-Run MS-DOS 6.0/Windows 3.1 • Mouse • 101-key keyboard
ST SYSTEMS	**Now with Pentium Power! Minitower expandability and value.**	
	• 60MHz Pentium $6,643 • 66MHz i486DX2 $3,578 • 50MHz i486DX $3,528 • Lease for as low as $123/Manth	• 64-bit Pentium processor* • 4 or 8* MB RAM • Up to 256 KB cache • 245 MB SCSI hard drive • 6 EISA slots • 5 drive boys • User-upgradable CPU • 3.5" floppy drive • Microsoft's Ready-To-Run MS-DOS 6.0/Windows 3.1 • 101-key keyboard • Mouse *With Pentium systems

Call Today For Latest Prices!!

© DIGITAL EQUIPMENT CORPORATION, 1993. The DIGITAL Logo and DECpc are trademarks of the Digital Equipment Corporation. OverDrive, Pentium, i486 and the Intel Inside Logo are trademarks of Intel Corporation. Windows is a trademark and MS-DOS is a registered trademark of Microsoft Corporation. Digital believes that the information in this advertisement is accurate as of its publication date; such information is subject to change without notice. Digital is not responsible for any errors. Actual monitor may differ from that shown. Not all products available worldwide.

Call 1-800-210-1401
Please reference BJL when you call

digital™

MediaMagic™.

The Trick to Mastering Multimedia.

A family of audio boards that perform like magic.

There's a trick to getting the most from multimedia. It's MediaMagic™. Our full-family of audio boards and sound systems deliver high-quality sound and outperform the competition without their high price or difficult installation.

Introducing the ISP-16 Audio Board. $99

When multimedia is more than a game.

The ISP-16 is big news for cost-conscious users. At just $99, you can buy two boards for the price of one Sound Blaster 16. And the features are identical. Both have 16-bit stereo sound, record and playback, 20-voice FM synthesis and CD-ROM interface. But only our ISP-16 supports popular Sony CD-ROM drives. Get our professional quality ISP-16 for a game-board price. Or upgrade to the ISP-16 Sound System, complete with CD-ROM drive, custom speakers and popular CD-ROM titles for hundreds less than our competition.

Enhance your multimedia experience with DSP-16 — For affordable, high-performance sound.

MediaMagic Digital Signal Processor (DSP) boards offer quality digital audio at affordable prices. You get 16-bit, 48kHz stereo, a CD-ROM interface and a joystick/MIDI port all in one package. Unlike other boards, the DSP-16 is compatible with AdLib, Sound Blaster, Business Audio, Windows Sound System and MPC-2. DSP-16 will also support future audio standards with a simple software upgrade while other boards just become obsolete.

DSP-16 SCSI and DSP-16 Plus – The ultimate in multimedia sound.

MediaMagic DSP-16 SCSI and DSP-16 Plus Audio Boards have all the features of the DSP-16 and more! Choose the DSP-16 Plus for MPEG II real-time data compression and WaveMagic, the wavetable MIDI synthesis professional musicians use. Or choose the affordable DSP-16 SCSI, and upgrade to WaveMagic with MPEG II later!

Products:	Digital Audio	Up grades	Wave Table	CD ROM	Real Time MPEG Video	Price*
MediaMagic™ DSP-16 Plus	16 bit 48 KHz	Yes	Standard	SCSI	Yes (upgrade/ decode)	$249.00
Sound Blaster 16 ASP	16 bit 44 KHz	Yes	Upgrade/ Upgrade	Proprietary	No	$349.00
Pro Audio Spectrum-16	16 bit 44 KHz	No	No	SCSI	No	$299.00

*Base SRP

MediaMagic Sound Systems — The complete multimedia solution.

We've combined our powerful MediaMagic audio boards with Sony and Toshiba CD-ROM drives, high-quality stereo speakers and popular CD-ROM titles for turnkey multimedia solutions that are powerful, affordable and easy to use.

Trade-up today and get up to $50 Cash Back

It pays to upgrade your system! Purchase one of our DSP audio boards, send us your old 8-bit board by January 31, 1994 and receive up to $50 cash back.

Price. Performance. Upgradeable. And a generous trade-up program. When multimedia sounds too good to be true, it's no trick. It's MediaMagic™. For your nearest dealer, or for more information, call.

800-624-8654

MEDIA MAGIC™

Circle 113 on reader service card.

USA: MediaMagic, a division of Austin Computer Systems, 10300 Metric Blvd., Austin, Texas 78758. Tel: 800-624-8654. Fax: 512-454-1367. International: IPC Corporation LTD, 29 Tai Seng Drive, Singapore 1953. Tel: 65-744 3088. Fax: 65-287 6806.

© 1993 MediaMagic, a division of Austin Computer Systems. MediaMagic™, MediaMagic Sound Systems™, MediaMagic Sound Systems (Plus) (Pro) (Special Edition)™, MediaMagic Sound Systems (Plus) (Pro) (SCSI) (Studio) (CD Video)™ are trademarks of Austin Computer Systems. Windows™ is a trademark of Microsoft Corporation. Sound Blaster™ is a trademark of Creative Labs, Inc. Pro Audio Spectrum™ is a trademark of Media Vision, Inc. All other trademarks are the property of their respective owners.

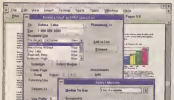
End the Fax Paper Chase with WinFax Pro for Networks

FAX ON DEMAND
With WinFax Pro for Networks, users have a couple of options for sending faxes.

From within WinFax Pro for Networks (top screen), select the Send icon. Type in the

name and fax number of the recipient, or select it from your phone book (phone books can be imported). Choose a cover sheet from the ones Delrina includes, design your own, or scan one into the system. Then select Add for attachments, which are the file or files you want to send, and select Send.

When sending from within an



app that supports WinFax Pro for Networks, such as Word for Windows (bottom screen), choose Printer Setup and select Print to WinFax. The Send Fax dialog comes up, and the process is identical to faxing from within WinFax Pro for Networks.

STILL WAITING FOR the paperless office? Delrina Technology, maker of the best-selling WinFax Pro package, brings you one step closer with its latest smart fax software. WinFax Pro for Networks brings all the features of the standalone package, and then some, to a LAN environment.

Like the original, single-user program, WinFax Pro for Networks includes drawing tools, a cover page designer, and multiple document logs and phone books—the latter are especially handy for LAN managers as the need to track communications becomes almost as important as the communication itself.

The program's most useful tool is its OCR feature, which is optimized for faxes with the integration of an intelligent spell-checker that helps the software discern between "Saturday" and "Saturday." There is also an image enhancement feature, called Fax-Vacuum, that improves the OCR system's capability to correctly read text by removing spurious spots and streaks caused by poor transmission or scan quality. WinFax Pro for Networks also supports any scanner that complies with the TWAIN standard.

The software separates network nodes into sharing stations, user stations, or both (with the appropriate software installed). Sharing stations have fax modems installed directly, while user stations are any nodes that have the user software installed. A sharing station may have as many as four fax modems attached, and each workgroup is limited to four of these stations, but there is an unlimited number per network. Each of the installed modems may be configured as outbound only or inbound/outbound.

A fax may be initiated from within WinFax Pro for Networks or from any of several applications within Windows. Although sending a fax is relatively straightforward and largely user-controlled, receiving a fax through the network requires much more preparation by the net administrator, and

WinFax Pro for Networks includes a host of nifty features, including an intelligent OCR system and a cover page designer, as well as support for most popular networks.

sometimes manual intervention to make sure a fax gets to the recipient. When working with an internal PBX or standard multiline installation, WinFax Pro for Networks allows the network administrator to set up "receptionists," sharing stations where an administrator manually forwards each incoming fax to the correct person. (Despite what the misleading documentation seems to indicate, the OCR system is not yet advanced enough to recognize a user's name on an incoming fax and route it to that person.)

A more convenient approach—if your phone system will support it—is to use either dual-tone multifrequency (DTMF) or direct inward dial (DID) automatic routing. Both methods use the telephone line to generate the address information for the incoming fax.

WinFax Pro for Networks comes in a base kit with two copies of Release 3.0 and WinFax Pro Server for $399. Additional server packs are $179, and additional user packs, for from 10 to 250 users, start at $999. People in your organization who are already using WinFax Pro 3.0 can upgrade to the network version for free. Delrina's pricing is peanuts for a solution that puts an intelligent fax machine on every user's desktop. **JOHN BRYAN**

WINFAX PRO FOR NETWORKS • $999, TEN-USER PACK • DELRINA TECHNOLOGY • (800) 268-6082, (416) 441-3676
Circle No. 626 on Reader Service Card

Don't Jump to a Graphic Conclusion

If you're about to take the plunge on a new graphics accelerator, get one that won't limit your future. ATI's GRAPHICS ULTRA+ and GRAPHICS ULTRA PRO give you no-regrets performance with all of today's applications. And they're perfectly poised for the leap forward into 32-bit operating systems and multimedia applications.

See Us At: COMDEX/Fall '93 Booth # L1114

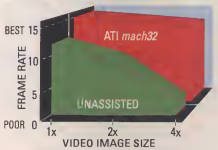
Get the Jump on the Latest Technology

Don't let inadequate technology give you or your PC a nervous breakdown. Our *mach32* Accelerator Chip and 2.0MB of standard memory accelerate graphics to heights that others can't match. And ATI's newest accelerators are multimedia-ready, with hardware-assisted scaling of motion video images under Windows for full screen playback.

accelerated by mach32 ATI TECHNOLOGIES INC

indeo INTEL VIDEO TECHNOLOGY

MULTIMEDIA ACCELERATION



Software Safety Net

Software driver support shouldn't have to be a giant leap of faith... but without it, an accelerator is just an expensive VGA card. ATI gives you the best driver selection with the full security of 8514/A-compatible acceleration, plus up-to-the-minute ATI drivers for all major applications, including 32-bit environments, like OS/2 2.1 and Windows NT.[1]

Don't Fall Behind

ATI helps you stay on the leading edge, without going over the brink financially. Our new upgrade plan[2] lets you move up to the latest hardware... at a fraction of the regular price.

GRAPHICS ULTRA+

- ▶ True color at 800x600 and 65,000 colors at 1024x768
- ▶ Non-interlaced 1280x1024 in 256 colors
- ▶ Flicker-free Windows, up to 76Hz refresh rate
- ▶ 2.0MB memory
- ▶ Fast DOS and graphics performance
- ▶ Enhances and accelerates Video for Windows
- ▶ **$299.00**[3]

GRAPHICS ULTRA PRO adds

- ▶ VRAM for better performance at higher refresh and greater colors
- ▶ Non-interlaced 1280x1024 graphics at 74Hz refresh
- ▶ ISA[4], or VL-BUS **$499.00**[3]
- ▶ EISA or Micro Channel **$549.00**[3]

So look before you leap. Drop in to your local ATI dealer and let our counselors help you avoid a graphic mistake.

Circle 112 on reader service card.

GRAPHICS ACCELERATORS • MULTIMEDIA • COMMUNICATIONS

Microsoft Windows Compatible · PC Magazine Editor's Choice · PC Magazine Editor's Choice · Microsoft MVP Winner · EISA Info

ATI TECHNOLOGIES INC. Perfecting the PC

ATI TECHNOLOGIES INC.
33 Commerce Valley Drive East
Thornhill, Ontario
Canada L3T 7N6
Telephone: (905) 882-2600
Facsimile: (905) 882-2620
User Support: (905) 882-2626
BBS: (905) 764-9404

Copyright © ATI Technologies Inc., 1993. ATI, GRAPHICS ULTRA+, GRAPHICS ULTRA PRO and *mach32* are registered trademarks of ATI Technologies Inc. All other company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. Features and specifications are subject to change without notice. Products may not be exactly as shown. [1]32-bit OS/2 2.1 drivers will be available in September 1993, 16-bit OS/2 2.1 drivers currently included. ATI drivers included in Windows NT package. [2]Tradeup plan to latest ATI products; call or fax for further information. [3]Suggested US retail prices, dealers may sell for less. [4]Mouse included with ISA versions only.

Announcing special designed just for the

If you're one of the following people, your new 1994 DOS or Windows Quicken upgrade is now ready. Both new Quickens are so loaded with new time savings, new financial insight, and new power to organize — you'll think we redesigned it just for the unique way you personally use Quicken. For instance:

A You're too busy to read anything else in this ad.

You busy on-the-go types will love having Quicken organize your finances the way you organize all your other activities — with the new Quicken Financial Calendar.* It remembers whom you pay, how much, when, how often — and makes the register entries for you automatically.

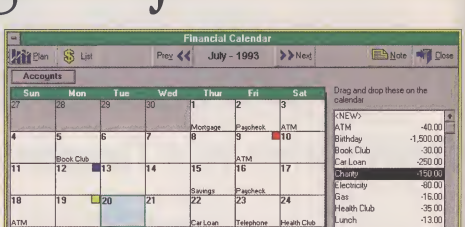
Whether the bill is a 36-payment car loan or a 360-payment mortgage, a twice-a-year property tax bill or your every-month phone bill — schedule it just once on the Financial Calendar, and you never have to enter it again. (You can confirm the amount each time if you wish.) And your regular deposits — weekly paychecks, monthly interest, whatever — are just as easy and convenient to handle automatically.

The Quicken Financial Calendar. It just may be the most radical planning-and-organizing tool since... well, the calendar.

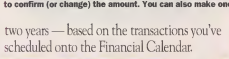
B You just like knowing where your money goes.

New QuickReports are just for you. Zoom out from any individual transaction in a register to see instantly when you last paid that bill or get a list of all transactions for that payee or category. It's like getting an instant "mini-report" any time you need it.

And for the first time ever, new Quicken 3 for Windows even forecasts your future. The new financial planning graph projects your account balances, cash flow and net worth for the next month — or up to the next two years — based on the transactions you've scheduled onto the Financial Calendar.



This could be the biggest breakthrough in Quicken ever! Just "drag and drop" transactions to the correct dates. Then let the new Quicken Financial Calendar make all your regular register entries for you automatically from now on. Or, you can put any transaction on "total automatic" and never look at it again — or you can be prompted each time to confirm (or change) the amount. You can also make one-time register entries with the Financial Calendar.



Use this graph to play "What if..." and see the precise impact that decisions like saving more, vacationing sooner or even eating out less will have on your future account balances.

C You don't just organize —you analyze in detail.

You can compare this year's income and expenses with last year's, or analyze your cash flow with percentage breakdowns. The new comparison report shows any two periods side by side — sorted by account, category, payee or class. And it gives the variance in dollars, as a percentage, or both.

You can also copy reports to the Windows* clipboard in tab-delimited format, for easy import into your spreadsheet or other Windows applications.

D You plan to retire someday. (Or you're already retired.)

Now you can see better than ever exactly how your retirement fund and investments are doing.

The new investment portfolio view provides instant comprehensive analysis of your investments' performance and value. Choose the investing measures that mean the most to you, from at least 14 different options — including estimated income, ROI, percent yield, and much more.

And now it's much easier to enter new investment activity, too. Just fill out the new onscreen investment activity form. It prompts you for the specific information relevant to virtually any investment transaction.

Quicken upgrades following people:

E You love Quicken's speed and ease.

The new amount field calculator is radically different — and it's the most convenient onscreen calculator ever. Just type any equation (such as "2.75 + 4.95 x 1.08") directly into the Payment or Deposit column, and it enters the answer for you automatically.

And the new date field calendar makes date entry easier than ever, with no typing.

Plus: backup is automatic in Windows now as well as DOS.

F Your Quicken is more than two years old.

If you've been too busy to upgrade lately, you've been missing some very popular new features. Like QuickFill.

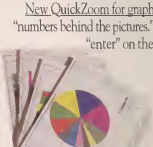
Plus IntelliCharge electronic credit card statements. And the innovations in QuickZoom, financial reporting and investment tracking we've mentioned all build on literally hundreds of earlier new features and enhancements. Like loan amortization, financial planning calculators and better links to tax packages, to name just a few.

And learning new Quicken features is easier than ever, too — with new Qcards to guide you step by easy step.

G You don't (and won't) do Windows.

New Quicken 7 for DOS has its own way of doing just about everything we've mentioned for Windows, plus special features which DOS users in particular will appreciate. For starters, your graphs look better, work harder, and you can print them out, too.

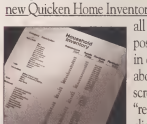
New QuickZoom for graphs shows the "numbers behind the pictures." So you can press "enter" on the graph of your May expenses, for example, and zoom to a pie chart breakdown on them. "Enter" again on any piece of that pie, and zoom to the transactions behind it. Yet another "Quicken easy" way to answer your questions fast!



To name just a few more items: Now you can save multiple budgets. And new Quicken 7 for DOS also remembers your last transaction so you can get to it in an instant. There's much more. We're as committed to DOS as you are.

H You can never be too organized.

Windows users: Introducing new Quicken Companion 2 for Windows — featuring the new Quicken Home Inventory. It organizes all your household possession records in one place, in about an hour. Just scroll through the "reminder list" and click on "your" items, keeping or changing the average replacement values as you go. Now you've got a complete insurance coverage report to help you make informed insurance decisions, and provide solid claim backup, too.



Quicken Companion also estimates personal taxes, provides online stock and mutual fund pricing, and includes expert tips for getting the most out of Quicken.

If you upgrade to Quicken 3 for Windows, be sure to get Quicken Companion, too.

I You like choosing from 3 special upgrade offers.

1. Get a $10 rebate on Quicken (and a $5 rebate on Companion) when you upgrade at your local store. Or . . .
2. Pay only $29.95* when you upgrade directly from Intuit. (Either way, your price should come out roughly the same.) Or . . .
3. Get both Quicken 3 and Companion 2 for Windows for just $49.95* (This special offer only available when you upgrade directly from Intuit.)

No-risk 60-day money-back guarantee.

To order direct, call

1-800-624-8742

24 hours a day, 7 days a week, US & Canada

*Plus $5.00 shipping and handling (US$11 in Canada, including GST)

Suggested retail price: Quicken is $69.95 and Quicken Companion is $34.95

Special offers end 12/31/93 Ad Code: FMBAS

New Canadian editions of new Quicken 7 for DOS and Quicken 3 for Windows are shipped to all Canadian addresses. New Quicken 4 for Macintosh is available now! If you're not delighted with any Intuit product, simply return it within 60 days for a full refund. Quicken is a registered trademark and Quicken Companion, Financial Calendar, Quicken Home Inventory, QuickZoom, QuickFill, Qcard, and IntelliCharge are trademarks of Intuit. Windows is a trademark of Microsoft, Inc. DOS, Windows and Mac feature sets vary. Foreign shipping additional. ©Intuit 1993.

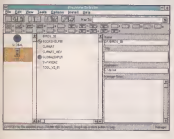
DOS System Requirements: 100% IBM® compatible PC with 640 RAM, DOS 3.0 or higher, and a hard disk drive. Graphs require graphics card. Guaranteed to work on your printer or monitor, or your money back. **Windows System Requirements:** 100% IBM® compatible PC, 286 or higher (386 recommended), Windows 3.1, 2MB RAM and 5MB free on your hard disk **Quicken Companion** requires additional 2MB free on your hard disk. Works with any printer or monitor supported by Windows 3.1. Quicken 7 for DOS and Quicken 3 for Windows are file compatible.

Discport: Easy Access to Multiple CD-ROM Drives on a Server

SOFTWARE SMARTS
Discview makes managing the Discport a breeze. Even users unfamiliar with NetWare volumes will find the action-bar mounting tool and drag-and-drop mapping easy to use.

Another plus is that Discview allows a disc to be associated with the program file required to access it, so you can launch it with a simple double-click on the CD in the Selector window.

Discview creates a database as discs are used, displaying the list in the Selector window. Discs can be grouped, and both



users and groups can be assigned access privileges. Meanwhile, complete statistics are maintained so that managers can track disc access, usage, and user activity.

THE MORE CD-ROMs the better. Providing network access to server-based CD-ROM drives has always been like preparing a gourmet meal from scratch—difficult. Now Microtest, with its Discport pocket CD-ROM server, makes accessing seven CD-ROM drives as easy as ordering a Happy Meal at McDonalds.

The most significant advantage of the Discport, which is about the size and shape of a video cassette, is that it doesn't plug into a server—you simply connect it directly to the network cable. On one end of the unit are connectors for thin Ethernet, 10BaseT cabling, and the power input. On the other end is a 25-pin D connector SCSI port and two status lights.

We found that the Discport took only about 15 minutes to install, but you have to be familiar with NetWare and, of course, have Supervisor privileges. The Windows-based Discview software walks you through the process quickly and smoothly and even takes care of installing the NetWare Loadable Modules required to access the Discport.

Once the Discport installation is complete, you're ready to attach CD-ROM drives to the unit's SCSI interface. As with any SCSI chain, the final device on the chain must be terminated and the drives must be configured with individual SCSI device numbers. Up to seven CD-ROM drives can be daisy-chained to the Discport.

After the hardware is set up, Discview's Map screen displays all the servers available on the network, as well as the Discport. You complete the CD-ROM configuration using a dialog box that lets you attach the Discport to the server of your choice. The CD-ROM drives are seen as volumes on the server and are handled the same way as any read-only removable media. The intuitive Discview software makes it especially easy to manage the drives. As many as nine Discports—each with seven CD-ROMs—can be attached to a server, the maximum allowed by NetWare's own 64 volumes-per-server limit.

In our tests, using two dual-speed Chinon CDX-535 CD-ROM drives, the Discport performed superbly. All caching of the drives is handled by NetWare on the server. Throughput was impressive, even though the server was a slow 386SX/16 system with only 8MB of RAM. Your performance may vary based on network traffic.

Microsoft Bookshelf performed flawlessly once the MSCDEX.EXE in our AUTOEXEC.BAT was replaced with DPCDEX.EXE, which came with the Discport. Other titles we experimented with included DeLorme's *Global Explorer World Atlas,* Multimedia Audubon's *Birds and Mammals,* the *IBM Ultimedia Tools Series Sampler CD,* and some disks of clip art. All ran as smoothly as if installed in the workstation's internal CD-ROM drive.

Discport works on thin Ethernet or 10BaseT networks running Novell NetWare 3.11 or higher and needs a server with a minimum of 8MB of RAM. The workstation requires DOS 3.3 or higher and Windows 3.1 or higher running in enhanced mode. As it is, with a suggested list price of $695 (CD-ROM drives not included), Microtest's Discport is a fast-food, seven-course gourmet banquet for NetWare users. **DENNIS FOWLER**

DISCPORT • $695 • MICROTEST • (800) 526-9675, (602) 952-6400
Circle No. 627 on Reader Service Card

Microtest's Discport attaches directly to your network, letting you connect up to seven CD-ROM drives per device to a server.

1. *Can your PC run DOS, Windows™ and OS/2® programs at the same time?*

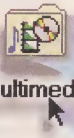
2. *Can your PC simultaneously format diskettes, connect to an online service like CompuServe™ and print a document?*

Can your PC pass this simple screen test?

3. *Can you save files under any name you want up to 254 characters long?*

4. *Does your PC come with over 25 useful productivity applets? Does it come with Adobe Type Manager™?*

5. *Can you "drag and drop" objects like files, folders and printers anywhere you want, to group and organize your on-screen desktop the way you want?*



6. *Can you take advantage of the latest, exciting multimedia video technology without buying additional hardware?*

Call for your free demo diskette.

If a program "crashes," can you recover without rebooting your computer? Can you run the new generation of 32-bit programs? If you answered no to any of the above, then it's time to say yes to a higher grade of PC performance.

Demand OS/2 2.1 preloaded on your next PC. With OS/2 2.1 in your PC, you can get a lot more out of your PC. It's simply a question of multiple choice. OS/2 2.1 lets you choose from the broadest range of PC programs available, and lets you get more from them than ever before. So there's only one final question: what are you waiting for?

OS/2 2.1 is available at local software dealers. To order or to find out more about OS/2 2.1, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999.

Operate at a higher level.™

IBM®

This ad was created by LINTAS and got to this publication on time using DOS, Windows and OS/2 programs running on OS/2. IBM and OS/2 are registered trademarks and "Operate at a higher level" is a trademark of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. CompuServe is a trademark of CompuServe Inc. Adobe Type Manager is a trademark of Adobe Systems Incorporated. © 1993 IBM Corp.

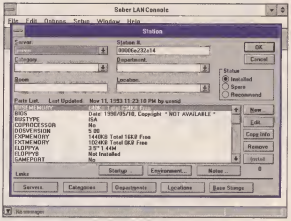
Saber Software Tames Your Wayward LAN Workstations

SET IT AND FORGET IT
The Saber LAN Workstation makes it easy to set up and schedule basic administrative tasks. Here we've set up a virus-checking program using McAfee's Scan. With all the

parameters only a mouse-click away, the job can be set up and on the schedule in a matter of minutes. With Saber LAN Workstation you don't have to drill down to see important information about scheduled jobs. The job title, its schedule, and the next time it's due to run are shown on the Scheduler Setup main

menu. And, if you no longer need a job to be run, you can delete it from the Setup menu without having to disassemble it piece by piece.

MANAGING A NETWORK is a lot like unraveling the Gordian knot—practically impossible unless you take drastic measures. Saber Software helps administrators slice through the tangle of LAN management duties with its Saber LAN Workstation package, a collection of tools that lets a network manager gather information about every network node and then customize and control the LAN from a single server. While optimized for Novell NetWare, LAN Workstation works with most popular LANs.



The Saber LAN Workstation Console collects and maintains configuration information about each node on the network, as well as any changes made to the configuration.

Four on the Floor

Although it performs unevenly, LAN Workstation does at least a fair job of tackling the four major problem areas for modern LAN managers: workstation management, server/network management, hardware management, and software metering.

LAN Workstation's poorest showing is in network monitoring. Mind you, LAN Workstation's system-management tools are first-rate. You can easily schedule jobs, such as systemwide backups. You can also set the system to monitor your server's hard drive usage. What's the problem? Sadly, LAN Workstation doesn't monitor network traffic, a key indication of network health.

Nevertheless, LAN Workstation does feature robust workstation management. You can automatically collect a wealth of information about any node on the system and then monitor any configuration changes made to either the hardware or system setup files such as CONFIG.SYS.

The LAN Workstation Shell is an iron fist of network security sheathed in the velvet glove of an intuitive menuing system. Users can be set up so that they can't even see, much less run, applications that they don't have permission to use.

The one thing that is missing from the workstation-management module is a software-distribution function. We were surprised, considering that LAN Workstation already has excellent software metering.

LAN Workstation does a nice job of tracking hardware. Although the command-line-interface program required to pull this information into the Windows data files is clunky, the results are worth it. CPU, BIOS, disk space, bus, and memory information are all collected in a matter of seconds per node. While some of this information isn't as precise as we'd like—LAN Workstation can't give you processor speed, only general CPU type—it's impressive.

Impressive Metering

As mentioned, LAN Workstation also does a good job of metering software. The product lets you restrict the number of users per application, and its keeps an eye on what should not be on your network.

A more serious concern for would-be buyers is that, although LAN Workstation performed very well, other programs give it a run for its money. While LAN Workstation's interface is better, Frye Computer Systems' Frye Utilities leads the administrator's aid field in quantity and quality. Our call? LAN Workstation deserves a look, especially by businesses with stringent security needs.

STEVEN J. VAUGHAN-NICHOLS

SABER LAN WORKSTATION • $195; $79 EACH ADDITIONAL WORKSTATION LICENSE • SABER SOFTWARE • (800) 338-8754; (214) 361-8086
Circle No. 628 on Reader Service Card

It sits, lies down, and does back flips.

Circle 219 on reader service card.

Good b

The most flexible screen ever seen

It opens flat up to 180°

Or flips around in just seconds

There's even a Docking Station™ unit for full desktop computing

oy.

The UltraLite® Versa™ notebook gives new meaning to the term "faithful companion."

Versa functions as a pen-based tablet to enter notes or data.

The reversible screen makes presentations a snap.

The UltraLite Versa is truly a breed apart. It's versatile and adapts easily to meet your changing needs, whatever and wherever. For example, switch from a mono to color screen, or put in more hard-drive memory. And despite its heavy-duty technology, the Versa weighs as little as 6 pounds.

Then there's the most sophisticated and flexible display on the market. Use it as a basic notebook, flip it around for presentations, or use it as a pen-based tablet. Plus, Versa's screen provides sharp contrast and brilliant graphics, monochrome or color.

With up to 10 hours of battery life, the one thing it won't do is play dead.

Yes, the Versa notebook knows a lot of tricks. Its i486™SL processor is fast and powerful, yet conserves power. Simply swap the floppy drive for an extra battery, doubling battery life.

And what's a notebook computer if you can't take it for long walks? Advanced PCMCIA communications capability means you can easily send and receive faxes and retrieve data.

We'll even come when we're called.

In addition to a standard 3-year limited warranty, you get UltraCare,℠ an enhanced, full-service program providing fast response and support anytime, anywhere, at home or overseas.*

Begging for more? Call 1-800-NEC-VERSA or for info via fax, NEC FastFacts™ at 1-800-366-0476, request document 8583772.

Because ⬆ is the way you want to go.

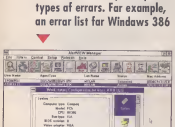
intel inside

NEC

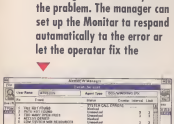
Circle 220 on reader service card.

AlertView 2.1 Is the Network Manager's Busy Little Helper

AUTO PILOT
The AlertView Manager module lets you tailor a profile for all users or individual users (top screen), so that the program monitors a workstation only for specific types of errors. For example, an error list for Windows 386



isn't really necessary for OS/2 machines. Error messages are recorded into the Event Monitor (bottom screen) and are differentiated by color and sound indicators, according to the severity of the problem. The manager can set up the Monitor to respond automatically to the error or let the operator fix the



problem manually. We recommend that, when practical, you let the program handle errors on its own, because the manual mode is cumbersome.

IF, LIKE MOST network managers, you're just one support call away from a nervous breakdown, don't despair—help is on the way from Shany. The company's network management and support application, AlertView 2.1, takes user support to new heights with tools that not only detect errors but also fix them automatically.

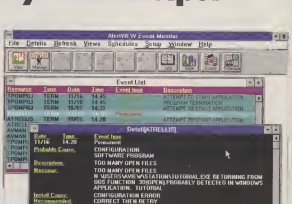
AlertView 2.1 comes in ten-user packs priced at $935. It sniffs out detailed application errors like "Out of Windows memory," via TSRs that reside on individual workstations. The client portion of the program reports back to a central AlertView Manager PC, which automatically deciphers the problem and sends the fix back to the user's PC. If you get a "Too many files" error, AlertView can modify the PC's CONFIG.SYS file, inform the user of the change, and even reboot the workstation.

We found AlertView 2.1 painless to install, although we initially balked at the fat AlertView Station TSR that takes up a full 22K of RAM (11K if loaded into expanded memory) on each monitored workstation. Each workstation runs the DOS AlertView Station agent and a Windows Station program that handles Windows-specific errors, called Events. The company also supplies an OS/2 Station agent. AlertView uses IPX, NetBIOS, or DCL (IBM PC LAN) protocols to communicate with the Manager station.

Closer to the hearts of PC LAN administrators, AlertView complements Novell's new NetWare Management System (NMS) down to the database level. PCs running AlertView's agents automatically get inserted into the NMS Map.

The AlertView Manager boasts basic remote control functionality that lets an administrator do remote diagnostics, although this isn't the product's strong suit. In fact, the remote control feature feels somewhat sluggish with its slow screen refresh.

AlertView really shines in the error detection and correction department.



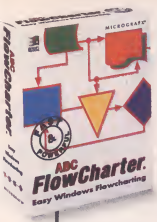
AlertView's Manager module keeps track of errors on each user's workstation and lets you drill down through the information to get further details about each event.

One of its coolest features is its automatic recovery mode. The program comes with hundreds of recovery routines and provides dialog boxes for building your own. After a "Too many files" error, we built a program to fix the problem in a matter of minutes. It was easy to assign the new, corrective procedure to one or all of the AlertView stations and immediately have a fix in place for users who run out of file space. AlertView also features Scheduled Procedures, which are especially handy when it comes to scheduling backups.

On the downside, we wish the product were a bit more intuitive. The Event Monitor and Manager are intimately related, yet moving between them is awkward. Also, the Getting Started documents were full of typos, making it difficult to understand the structure and operation of the program.

Nevertheless, AlertView is a real boon for anyone with little time and lots of users, and it's unique in its ability to ferret out errors and apply fixes. If you can stand the memory overhead on your users' workstations, AlertView 2.1 could be your new best friend. **TONY POMPILI**

ALERTVIEW 2.1 • $935, TEN USERS • SHANY COMPUTER • (415) 694-7410
Circle No. 629 on Reader Service Card



For Fast Efficient Process Mapping, There's Only One Way To Go.

Micrografx ABC FlowCharter® for Windows takes the frustration out of mapping the way work flows through your organization. Simple-to-learn, specialized tools help you create flow charts that can easily be reconfigured as quickly as you generate new ideas. Like multiple palettes of standard shapes as well as the option to incorporate clip art or scanned images. Automatic linking instantly connects shapes as they're added. Plus text can be edited right on the charts, in a variety of fonts and sizes. We even provide friendly telephone support 24 hours on weekdays and 8 a.m. to 5 p.m. CST on weekends (U.S. only).

Simply choose a shape and place it. Lines automatically connect and stay connected if shapes are moved.

So take the first step in improving efficiency in your company. To find out more about ABC FlowCharter call 1-800-578-1720 or contact your local software dealer.

M I C R O G R A F X

ABC FlowCharter

Micrografx Inc. 1303 Arapaho Road, Richardson, Texas 75081 (214) 234-1769. Micrografx also has offices in London, Austin, Paris, Munich, Milan, Sydney, Copenhagen and Tokyo. Copyright © 1992 Micrografx, Inc. All rights reserved. Micrografx and ABC FlowCharter are registered trademarks and ABC Insights is a trademark of Micrografx, Inc. All other product or service marks are trademarks or registered trademarks of their respective owners.

Circle 260 on reader service card.

The perfect laser for today.

THE EPSON
ACTIONLASER 1500

The Epson ActionLaser 1500 is a terrific laser printer, right out of the box, right now. But should your printing requirements change, the ActionLaser 1500, unlike some others, has the ability to expand with you.

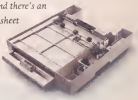
ALL COMPANY AND/OR PRODUCT NAMES ARE TRADEMARKS AND/OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE MANUFACTURERS, INCLUDING PCL 5 WHICH IS REGISTERED BY HEWLETT PACKARD CO. EPSON DISCLAIMS ANY AND ALL RIGHTS IN THOSE MARKS. EPSON IS A REGISTERED

The perfect laser for tomorrow.

Epson's RITech (Resolution Improvement Technology) increases the ActionLaser's normal 300 dpi print quality to eliminate jagged edges right where you need it: in the curved lines of letters, numbers and images. And Epson's MicroArt Printing technology gives you blacker blacks and finer lines.

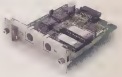
27 fonts (13 scalable) are standard. Should you expand your typographical horizons, unlimited fonts are easy to install via HP-compatible plug-in cartridges, available anywhere.

The ActionLaser has 150 sheet paper capacity (letter or legal), and handles stacks of labels, envelopes and overheads with ease. And there's an optional 250 sheet auto-feed cassette, for a total of 400 sheets.

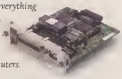


The ActionLaser 1500's top speed is six ppm, fifty percent faster than others in the same price range. That's fast.

If you have a DOS machine, but decide to get a Macintosh, do you need a new printer? Not with an ActionLaser 1500. Just add our EpsonTalk interface and your Mac plugs right in.



The ActionLaser 1500 comes standard with parallel and serial interfaces that allow two users to share a single printer. Add another interface and a third user can share the same printer. The ActionLaser 1500 can connect to everything from PCs to IBM mini and mainframe computers.



THE EPSON ACTIONLASER 1500

It's easy to add more memory. Just pop in inexpensive, industry standard DRAM chips for a maximum of 5 MB.

PCL 5 emulation is standard. The extra power of Adobe PostScript is a simple plug-in option.

PC Computing Best Buy (June 93). The word is getting around. The Epson ActionLaser 1500 is the best choice in personal lasers.

The ActionLaser 1500 comes with Epson's limited two year warranty. For help, call the Epson Connection. Quite possibly the best help line in the business.

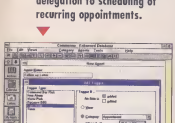
The only printer worth buying today is one that can take you into tomorrow. That's why we designed so many expandable features into the ActionLaser™ 1500. Test drive a few lasers. You'll soon discover the speedy, inexpensive ActionLaser 1500 is the one laser you want parked on your desk. For information on the Epson ActionLaser 1500, our ink jet and dot matrix printers, or scanners, call the Epson Connection™ at **1-800-BUY-EPSON** (800-289-3776).

EPSON®

TRADEMARK OF SEIKO EPSON CORP ©1993 EPSON AMERICA, INC., 20770 MADRONA AVE., TORRANCE, CA 90503 FOR DEALER REFERRAL OR WARRANTY DETAILS, CALL 800-BUY-EPSON (800-289-3776) IN CANADA, CALL (800)GO-EPSON FOR LATIN AMERICA, 305-265-0092

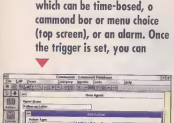
Overworked? Let Commence's Agents Take Over for You

AGENTS AT WORK
With Commence 2.0 you can define up to 200 agents per database, automating everything from task delegation to scheduling of recurring appointments.



Setting up agents can be daunting, but Commence includes an assortment of predefined agents that teach by example.

To set up an agent, you must first define a *trigger*, which can be time-based, a command bar or menu choice (top screen), or an alarm. Once the trigger is set, you can



specify up to two additional conditions that have to be met for the agent to take up to four actions (bottom screen).

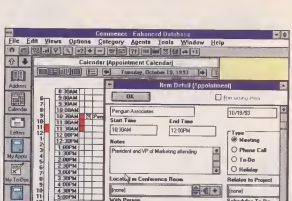
WILLING TO DO some up-front work for a big payoff? The latest release of Jensen-Jones' automated information manager Commence 2.0 is not for the faint of heart, but it can be a powerful tool in the right hands. Version 2.0 features beefed-up network and remote support and improved integration with other applications. At the same time it retains its ultraslick agents, which let you automate scheduling, contact management, and system tasks.

Billed primarily as a contact manager, Commence comes with two predefined databases that let you enter contact names and vital information, as well as schedule appointments. You can also design databases—up to 50. Information in each database is organized into categories—phone list, appointments, letters, and so on—and you can define connections between items in different categories.

When scheduling an appointment, for example, you can specify a connection between that meeting and an individual in your Person category. When calling up that meeting reminder, you can access the contact file of the connected person by double-clicking on the name. You can also set multiple filters to configure different views of category information—for example, you can have Commence display only names and numbers of the people in your address book.

Commence for Workgroups extends the standalone package to the network. Instead of implementing a single shared database, the LAN version uses a distributed database, with a shared copy on the server and local copies of the shared database for each user. This eliminates the hassle of file- or record-locking, so each user can update items without delay.

Notebook users can take Commence on the road—any changes made to the client copy of the shared database can be automatically updated using the SyncLink feature, which,



Each item in Commence can be connected to items in other categories so you can, say, link appointments in your calendar with contact information in your address book.

as its name implies, resynchronizes the server copy and all client copies.

Commence's flexibility extends beyond its ability to interlock and customize database information. The program uses "agents" to automate complicated routine tasks based on user-defined conditions. The ability to launch a DOS session so that you can set up agents to automate system tasks—like weekly backups—is an outstanding plus.

Unfortunately, Commence's greatest strength—its flexibility—is also its biggest weakness. The features that let you customize are the hardest to use; even setting up a filter to view selected information can be an exercise in frustration.

But don't let this sour you on Commence. It's a great program, despite the steep learning curve. You'll need at least a 386 with 3MB of RAM and 6MB of free disk space for the client/standalone package, and a server with 4MB of RAM and 10MB on the hard disk. At $695 for a three-user pack or $1,995 for a ten-user pack, Commence is also competitively priced for what it provides. If you're not afraid to roll up your sleeves and do some dirty work, Commence is a definite time-saver. **SHYAMALA REDDY**

COMMENCE 2.0 • $695 FOR THREE-USER PACK; $1,995 FOR TEN-USER PACK • JENSENJONES • (908) 530-4666
Circle No. 667 on Reader Service Card

SecurExchange: Protect Your Network Mail from Prying Eyes

Overworked? Let Commence's Agents Take Over for You

Agents at Y

With Commence
can define up to
per database, o
everything from
delegation to s
recurring appoi

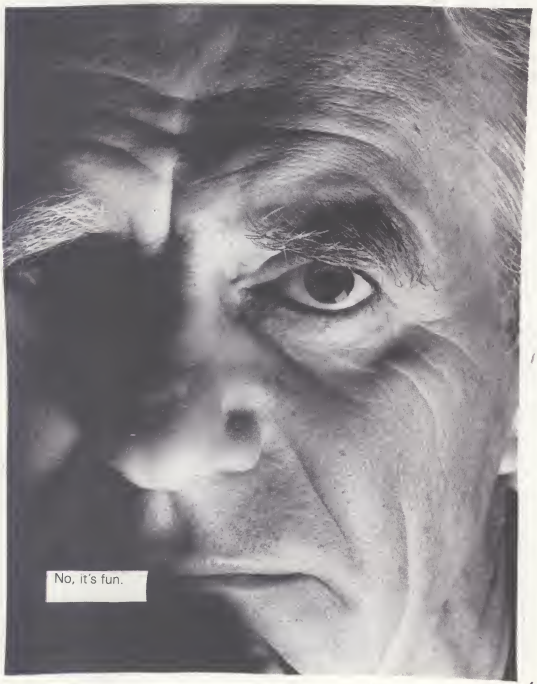
Setting up age
daunting, but t
includes an oss
predefined age
by example.

To set up an
must first defi
which can be ti
command bar c
(top screen), o
the trigger is s

specify up to f
conditions tho
for the agent
four actions (l

SecurExchange: Protect Your Network Mail from Prying Eyes

Overworked? Let Commence's Agents Take Over for You



SecurExchange: Protect Your Network Mail from Prying Eyes

Overworked? Let Commence's Agents Take Over for You

Ag
With
can c
per c
ever
dele
recu

Sett
dau
incl
prec
by c
T
mus
whi
com
(top
the

spe
con
for
fou

The new MultiSpin™ 3X CD-ROM reader.
Everyone's talking about it.

SecurExchange: Protect Your Network Mail from Prying Eyes

ANY EDUCATED USER knows it: E-mail is not | network add-on that provides public key

Of course you want it. Everyone wants it.

After all, NEC's new MultiSpin 3X CD-ROM readers are the first triple-speed readers on the market. You see, while everyone else was playing around with double speed (a technology we invented) we were making our readers spin three times faster. So now you can get information quicker than you can with standard readers, and see smoother animation and video.

And because we want to satisfy your every need, we made our readers more interactive too, adding audio controls and an LCD display to the front panel. So you don't have to rely on your computer to tell you what's going on. We even have a 4X reader for hardcore software developers. Which means our new MultiSpin CD-ROM readers are not only the fastest, but the most convenient and easiest to use.

There's just one problem. Once you do it, it may be hard to stop.

For more information, call 1-800-NEC-INFO. Or, for details via fax, call NEC FastFacts™ at 1-800-366-0476, request document #23768.

◀ STAMP OF APPROVAL

ecurExchange,
ates a
est, providing
ntation as name

ap screen).
gram has a
orm,
an add or delete
request is
ent to the
ha "notarizes"

he master user
en). This sets up
encryption key
e're mystified as
rization and
andled in one
vise the startup

Overworked? Let Commence's Agents Take Over for You

AGE
With
can d
per d
every
deleg
recur

Setti
daun
indu
pred
by e
To
must
whic
comr
(top
the t

spec
cond
for t
four

MultiSpin and FastFacts are trademarks of NEC Technologies Inc. NEC # G00091A2B341 © 1993 NEC Technologies Inc.

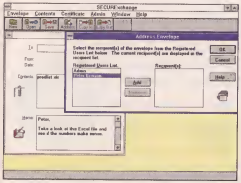
SecurExchange: Protect Your Network Mail from Prying Eyes

ANY EDUCATED USER knows it: E-mail is not secure. Between sender and recipient, a dozen or more people may have access to a message traveling across a network. Traditionally, administrators have had to rely on mail programs to provide data encryption. Now, Datamedia offers SecurExchange, a network add-on that provides public key encryption for use with any e-mail package.

Both administrator and users install the same software, although the administrator needs to call Datamedia to register the package to ensure that all the encryption keys he or she generates are unique.

The add-on uses an envelope metaphor to encrypt data. Click on the New button on the Action bar, and you get a simple form. Choose a recipient, then attach files and/or include a memo. Once saved, the file can be attached to any mail message (the file gets a default .ENV extension). As long as you use the same certificate, the message can be modified and re-sent. After a recipient opens an encrypted message, files can be copied out or deleted.

SecurExchange is ultrasimple. We also like its price: $995 for 25 users—well worth it to protect sensitive information. **SHYAMALA REDDY**



With SecurExchange, users can take advantage of public key encryption to protect any file or message.

SECUREXCHANGE • $995, 25-USER PACKAGE • DATAMEDIA • (600) 886-1570
Circle No. 630 on Reader Service Cord

STAMP OF APPROVAL
After installing SecurExchange, each user generates a Certificate Request, providing such vital information as name

and password (top screen). Although the program has a default request form, administrators can add or delete fields. Once the request is completed, it's sent to the administrator, who "notarizes"

it and updates the master user list (bottom screen). This sets up a unique public-encryption key for the user. We're mystified as to why the notarization and update aren't handled in one step, but otherwise the startup is a snap.

Beat the Cable Blues with DEC's Wireless WaveLAN Network Adapters

PULLING CABLE IS usually the toughest part of network setup, but you don't always have to wire network nodes. If you're not worried about hot speed, DEC's wireless WaveLAN network adapters may be what you need.

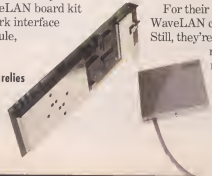
WaveLANs work under Novell NetWare or any Network Drivers Interface Standards-compatible NOSes (but the three-quarter-length cards won't fit into most portables).

WaveLAN links up to 80 users per group. Each board has a four-digit code signature for node identity and security.

A standard WaveLAN board kit includes the network interface card, antenna module, mounting bracket, software, and installation guide. DEC says the boards transmit as far as 800 feet in an open office environment; although we couldn't test that distance, they worked between two rooms 30 feet apart—if the doors were open.

While DEC claims a WaveLAN network supports 80 light-traffic network users, it recommends 20 under heavy traffic. We seriously doubt that *any* power network users would be interested, because maximum bandwidth is 2Mbps, and average is 1.3Mbps.

For their level of performance, the WaveLAN cards are priced high—$700 *each*. Still, they're easy to set up and reliable, making them good candidates for networking hard-to-reach places. **JOHN BRYAN**



The WaveLAN system relies on spread-spectrum technology to replace network cable.

WAVELAN • $700 • DIGITAL EQUIPMENT CORP. • (800) 344-4825, (508) 493-5111
Circle No. 631 on Reader Service Cord

Picks and Pans on CD-ROM: From Aliens to Shareware

Space Quest IV—Roger Wilco and the Time Rippers

OK, we love anything in a space suit—especially if it's tongue-in-cheek. *Space Quest IV* is a blatant CD-ROM send-up of the game King's Quest. King's Quest is a real yawner, but the premise is similar to *Space Quest*'s. You lead a

character, space hero Roger Wilco, through rooms and city streets of the future (rather than castles and forests as in King's Quest). All the while, you have to make Roger avoid the alien who's out to kill him. What sets *Space Quest* apart from other adventure games is that it has a good sense of humor. Rambling through the game with little attention to strategy is as much fun as playing to win.

SPACE QUEST IV—ROGER WILCO AND THE TIME RIPPERS • $54.95 • SIERRA ON-LINE • (800) 326-6654, (209) 683-4468
Circle Reader Service No. 673

CD-ROMS ARE ALL the rage, and at *PC/Computing* we get to see the best of the best before they hit the streets. From Beethoven to Battle Chess, we look for the standouts in CD-ROM each month. The following products were taken for a spin this month by our resident master of CD-ROM titles, Ron White.

Murmurs of Earth: The Voyager Interstellar Record

Been nuts about outer space since Sputnik? We have, so it stands to reason that if we find a CD like *Murmurs of Earth* disappointing, it's questionable who *is* supposed to like it. Essentially, this disc is a slide show of all the images that were included on the *Voyager* space probe. (You know, *Voyager* is the one in the first *Star Trek* move, the one that returns to earth as an intelligent organism the size of Nebraska and is real ticked that the schlemiel who created it a century before won't pick up the phone.)

The photographs and drawings from *Voyager* are supposed to give clues about the race that created the space probe to some alien intelligence that happens across it eons from now. The problem is that the disc is all images from beginning to end. Although it's accompanied by a thick paperback that gives more details about the subjects of the photographs and drawings, none of this is on disc. And the music that went along for the ride on *Voyager* is contained on a separate CD you have to play on—get this—your *audio* CD player. Bogus. The CD-ROM intended for your computer is simply an afterthought to the rest of the material here. This is *not* what we want out of a CD-ROM.

Type Treats

Computer printing does not live by Times Roman, Helvetica, and Bodoni alone. Once in a while, you need to get wild and crazy with your documents. That's when it's time for Raynbow Software's *Type Treats*, a collection of more than 500 shareware and public-domain fonts. Most are strange display typefaces or dingbats. One typeface, for example, creates an outline for each of the 50 states; another is a set of animal outlines. Pretty weird.

Not your everyday typefaces, obviously, but their sparse shareware prices usually match their sparse use. They are all in Type 1, Type 3, TrueType, Nimbus Q, and Corel WFN formats. But test any font before paying its shareware fee because some shareware fonts give applications fits. And please, be careful with weird typefaces. In the hands of the garrulous and verbose, they can be deadly.

Shareware Extravaganza

Not all shareware is fun and games. There's a wealth of shareware and public-domain programs and utilities that can benefit any business. And there are also a lot of fun and games. You can get most of them by spending hours downloading from a BBS, or you can buy *Shareware Extravaganza*. On four CDs, *Shareware Extravaganza* contains more than 25,000 files, made up of shareware and public-domain programs, including 800MB of Windows programs—the biggest single CD collection we've found so far.

All the files are nicely divided into games, clip art, spreadsheet, database, word processor and programmer utilities, music, and graphics. And all the files are accessible through a menu that gives a brief description, unzips the files you select, and then presents them on another menu from which you can run the programs. You'll find more programs here than you'll ever be able to use in your lifetime—a real bargain. **RON WHITE**

MURMURS OF EARTH: THE VOYAGER INTERSTELLAR RECORD • $59.99 • TIME WARNER INTERACTIVE GROUP • (800) 593-6334, (818) 955-9999
Circle No. 632 on Reader Service Card

TYPE TREATS • $90 • RAYNBOW SOFTWARE • (800) 456-5269
Circle No. 633 on Reader Service Card

SHAREWARE EXTRAVAGANZA • $89 • CROSLEY SOFTWARE • (514) 739-9328
Circle No. 634 on Reader Service Card

HOW TO BUY A DOUBLE-SPEED CD-ROM... WITHOUT GETTING TAKEN FOR A DRIVE.

Introducing Creative OmniCD.

If you've been thinking about adding the power and excitement of an internal CD-ROM to your PC, here's some great news: thanks to our exclusive Creative Double-Speed Technology,™ *double-speed CD-ROM performance is now available at about the same price you'd expect to pay for a single-speed drive.*

And we're not talking about just any CD-ROM here. This is a full-featured, MPC 2 compliant, XA-ready, 300KB/second, multi-session photo CD drive with a blistering fast 320ms access time: The all-new Creative OmniCD.™

WORKS WITH ANY SOUND CARD.

Of course Creative OmniCD works with your Sound Blaster™—after all, it is the industry standard for PC audio. But what if you've already got another sound card?

No problem. Because *Creative OmniCD works perfectly with just about every major brand of audio card*...or even *without* a sound card for applications that don't use audio.

Best of all, Creative OmniCD opens up a whole new world of CD-ROM applications. Like photo CD—we've even included Aldus™ Photostyler™SE image enhancing software right in the box. And also games, multimedia and business applications, education, and more.

THE BOTTOM LINE: A LOT MORE DRIVE, A LOT LESS MONEY.

Sure, there's plenty of other manufacturers offering double-speed CD-ROM drives. But as part of a complete package *with an SRP of less than four hundred dollars?* Now *that's* Creative.

For more information and the name of your nearest Creative Labs dealer, call 1-800-998-5227.

Sound BLASTER™ CREATIVE™ CREATIVE LABS, INC.

PC2 Multimedia PC

*S87 S399 05

© Copyright 1993 Creative Technology Ltd. Creative Double-Speed Technology, Creative OmniCD, Sound Blaster and the Sound Blaster and Creative logo are trademarks of Creative Technology Ltd. All other trademarks are the property of their respective owners. U.S. inquiries: Creative Labs 1-800-998-5227 or 1-408-428-6600. International inquiries: Creative Technology Ltd., Singapore. TEL 65-773-0233 FAX 65-773-0353.

Circle 187 on reader service card.

THE LATEST UPGRADES TO PRODUCTS YOU USE. **BY MIKE HOGAN**

Spotlight

Sound and Graphics

While Intel's Peripheral Component Interconnect local bus slowly moves toward release, VESA VL-Bus graphics cards continue to proliferate—and several have features that look forward to a multimedia future.

Genoa mixes true-color graphics with sound in its **AudioGraphix,** which adds an audio chip set to the Cirrus Logic GD5426 graphics accelerator from Genoa's Windows VGA VL-Bus adapter. AudioGraphix is capable of displaying 256 colors at 1,024-by-768-pixel resolution with the standard 1MB of dynamic RAM, and 65,000 colors at 1,024-by-768 when you boost video memory to 2MB. A Yamaha OPL2 audio component provides an 11-voice FM MIDI synthesizer, and an ESS488 chip set records and plays back audio at sample rates of 4kHz to 22kHz. Compatible with Windows' Sound System and First Byte's Monolog, AudioGraphix also includes several third-party software packages to get you rolling. ($249; Genoa Systems; 800-934-3662, 408-432-9090)
Circle Reader Service No. 646

Multimedia innovator Media Vision has introduced its first pair of graphics adapters tuned for no-compromise display of moving 3-D objects, morphing, and other special effects. The **Pro Graphics 1024,** for monitors 15 inches and smaller, and the **Pro Graphics 1280,** for those 17 inches and larger, support 24-bit true color (16.7 million colors) at resolutions of 1,024-by-768 and 1,280-by-1,024 respectively. Both boards are VESA VL-Bus–compatible and offer noninterlaced refresh rates of 75Hz at 1,024-by-768 resolution. Small wonder: The Pro Graphics 1024 comes standard with 3MB of memory, while the Pro Graphics 1280 comes with 4MB. (Pro Graphics 1024, $599; Pro Graphics 1280, $995; Media Vision; 800-684-6699, 510-226-2590)
Circle Reader Service No. 647

WordPerfect 5.2 for OS/2

IBM's fledgling OS will get a big boost from this one: WordPerfect is shipping a version of its best-selling word processor that takes full advantage of OS/2's 32-bit instruction set and graphical user interface. The result is a quiver of cutting-edge features, including a high-performance file system with long filenames that are indexed for quick searching, multithreaded background/foreground processing (in which the CPU processes instructions from multiple documents alternately), and drag-and-drop launching and printing of documents from within the workplace shell. This version of WordPerfect also reads documents from the DOS and Windows versions. ($495, or $129 for upgrades; WordPerfect Corp.; 800-451-5151, 801-225-5000)
Circle Reader Service No. 635

Automenu 5.0

One of the most popular shareware programs ever, Automenu now has an updated look, with menus arranged in overlapping windows. You can launch programs from the menus with a single keystroke or mouse click, or you can opt for the old list form. The installation module automatically detects applications and creates a menu choice for each. You can also schedule events to take place at a certain time or date, or in response to a specified keyboard activity. Hotkeys are available for any program included on a menu. ($69.95; Magee Enterprises; 800-662-4330, 404-446-6611)
Circle Reader Service No. 636

MonitorMiser

Energy efficiency is the future for all PCs, but don't wait to buy a whole new system before you go green. Most energy savings are realized at the monitor. MonitorMiser, a mouse-sized device that plugs in between your monitor and power cord, will lower any monitor's power consumption from its normal 100-to-120-watt operating level to a fraction of a watt after a specified period of idleness. ($79.95; Technology Marketing Partners; 415-940-7800)
Circle No. 637 on Reader Service Card

Lucid 3-D for Windows

The original multidimensional spreadsheet has gone Windows. Introduced as a DOS spreadsheet in 1987, Lucid 3-D now comes in a Windows version that employs the folder metaphor to let you link entire worksheets, cells, or ranges. Small and fast enough to be ROMmed into handheld products like the Casio Boss, Lucid 3-D is aimed at small-business users and includes 50 common business templates, plus 140 financial, statistical, and mathematical functions. ($109.95, or $49.95 for upgrades; Lucid Corp.; 800-925-8243, 214-994-8100)
Circle No. 638 on Reader Service Card

PC-Write 4.1

If you're only a casual word processor user, why contend with the extra burden of advanced features and layers of cascading menus? Version 4.1 lets you start out with just the basics of PC-Write, and add more features as you want them. This DOS-based word processor offers Windows Clipboard support, automatic envelope addressing, and even the abilities to add charts and signatures, and draw in a file. And it's cheap. ($69, or $59 for upgrades; Quicksoft; 800-888-8088 or 206-282-0452)
Circle No. 639 on Reader Service Card

YOU CAN'T CONTROL YOUR BOSS, YOUR WORKLOAD, YOUR WEIGHT, YOUR BACKHAND, YOUR WEEDS, YOUR DOG, YOUR LIFE. AT LEAST NOW YOU CAN CONTROL YOUR CURSOR.

At Microsoft, we feel there are enough things in the world that follow their own unpredictable path.

So we redesigned just about every aspect of the new Microsoft® BallPoint® mouse to let you regain control of your portable computer.

We started by changing the weight of the ball. We improved the smoothness of the tracking mechanism. We reshaped our mouse to fit your hand better. We even added software features that make it easier to find and control your cursor.

All of which means, in simple terms, that the cursor will now do what you want it to do.

And which is why, in independent tests, people worked 35% faster with the BallPoint mouse than with other leading portable and built-in pointing devices.

Of course, you should try it yourself. So pick up a BallPoint mouse at a computer store today.

And have one aspect of your life firmly, and comfortably, in the palm of your hand.

Microsoft®
Making it easier

WINDOWS. © 1993 Microsoft Corporation. All rights reserved. Microsoft and BallPoint are registered trademarks and Windows and the Windows logo are trademarks of Microsoft Corporation.

Short Takes

Canon's BJ-200 monochrome ink-jet printer should be available for less than $300 on the street in the near future. Canon has dropped the suggested list price on the 360-dot-per-inch, laser-quality Bubble Jet by 12 percent, to $399—which will probably translate into a $299 street price. The BJ-200 Bubble Jet first shipped in October 1992. ($399; Canon Computer Systems; 800-848-4123, 714-438-3000)
Circle Reader Service No. 648

Texas Instruments MicroMarc ink jet printer has had $90 lopped off its suggested retail price, bringing it to $329. The street price should be somewhere around $279. The *MicroMarc* prints laser-quality text-only documents at up to 4 pages per minute—somewhat slower with graphics added. ($329; Texas Instruments; 800-847-2787, 214-995-2011)
Circle Reader Service No. 649

Laser Pro Remanufactured Laser Cartridges are 15 to 20 percent less expensive than brand-new laser-printer cartridges and offer 20 percent more toner. The remanufactured cartridges sell for $65 and are guaranteed against leakage. In addition, Laser Pro will give you $5 plus shipping charges for each of your spent cartridges even if you don't buy a new one. ($65; Laser Pro; 800-377-0551, 708-893-1888)
Circle Reader Service No. 650

NEC MultiSpin CD-ROM Readers have experienced across-the-board price cuts of up to 24 percent. New estimated street prices for the internal MultiSpin 84 and external MultiSpin 74 are $550 and $615, respectively. The selling price for NEC's MultiSpin 38 portable unit could be as low as $465. (NEC Technologies; 800-632-4636, 708-860-9500)
Circle Reader Service No. 651

Designer 4.0

This vector-based illustration program for professional designers adds a new interface and an interactive toolbar. Context-sensitive help menus pop up at critical junctures, while a hint line speeds up the selection of Designer's 29 precision drawing tools. Version 4.0 also permits you to edit previously curved or skewed text. ($409, or $149.95 for upgrades; Micrografx; 800-697-2610, 214-234-1769)
Circle No. 640 on Reader Service Card

Central Point Backup: 8.0 for DOS, 2.0 for Windows

Different names, same program: Central Point's Backup versions for DOS and Windows have expanded virus protection, allowing them to detect more than 1,300 viruses prior to backup. Also new to these versions are several layers of data encryption, file viewers, and the abilities to format, erase, and verify backups on tape drives. ($129.95, or $39.95 for upgrades; Central Point Software; 800-445-4208, 503-690-8090)
Circle No. 641 on Reader Service Card

WinSleuth Gold Plus

You don't need to know how your television works to use it, but you really can't afford not to know what's going on inside your PC. WinSleuth Gold Plus, the fourth in the series, makes sense of your Windows setup and PC component performance with balloon help and a new customizable interface. You get charted statistical information on a passel of benchmarks for disk I/O, video, and CPU performance. It also helps with the configuration of many add-in boards and creating a safety disk of critical files like CMOS settings. ($99.95, or $59.95 for upgrades; Dariana Software; 800-892-9950, 714-236-1380)
Circle No. 642 on Reader Service Card

Moon Valley ROMaterial

An Alaskan cruise ship sails past bears pawing at salmon; you orbit the Earth in the Space Shuttle. Moon Valley brings new excitement to your desktop with 200 animated icons, wallpaper, and more than 100 full-motion screen savers on one CD-ROM for as low as $15 on the street. You get hoots, howls, other animal sounds, and voices in six languages. ($29.95; Moon Valley Software; 602-375-9502)
Circle No. 643 on Reader Service Card

WordScan 2.0, WordScan Plus 2.0

If faxed documents were perfect, any OCR package could read them. But it's the fly tracks, smudged letters, and muddy photocopies that find their way to the fax machine and put such a hit on productivity at the other end. Calera has applied a fuzzy-logic solution to the problem to come up with a pair of OCR packages that offer greater accuracy and the ability to fax without exiting other Windows applications. WordScan 2.0 is a receive-only bitmap-to-text converter, while WordScan Plus 2.0 both sends and receives. (WordScan 2.0, $295; WordScan Plus 2.0, $695; Calera Recognition Systems; 800-422-5372, 408-720-8300)
Circle No. 644 on Reader Service Card

Intel FaxModems

As the number of fax modems has exploded, prices have plummeted, leading Intel to expand its SatisFaxtion line downward. The new Intel FaxModem family starts with a $79 internal modem with 2,400-bit-per-second (bps) data and 9,600-bps fax transfer rates. Six new internal and external models offer transfer rates of up to 14,400 bps in both fax and data mode for less than $300. ($79 to $299; Intel Corp.; 800-538-3373, 408-765-8080)
Circle No. 645 on Reader Service Card

Why 2,000,000 people trust us with their savings.

Your data and your time.

What could be more valuable?

And what could be more useful than a software package that saves both?

With more than 2,000,000 copies sold so far, Fastback Plus is used by more people than any other backup software.

And not one copy has ever been returned for failure to restore data.

Fact is, you – or the people who work with you – can destroy up to 50% of the information on a tape and still restore every last byte, error-free. Whether you're using Fastback Plus for DOS, for Windows, for OS/2 or for Macintosh.

And if it weren't for our UNIX version, the smallest corrupted sector could bring your backups, your restores and perhaps your career to a screeching halt.

Of course, even the most reliable backup software can't be relied upon at all if it isn't being *used*.

Which explains why all five Fastbacks let you schedule automated, unattended backups.

And why all five are so easy, so accessible and so intuitive, complete with multiple user levels.

Our Windows and OS/2 versions let you customize the interface.

While the interface for our new DOS version is customized already.

Based on input from 2,000 people and developed with the hands-on assistance of 40 users brought to our offices during a month of exhaustive usability testing, it packs a wish list of the brand new and the tried-and-true. From one-screen file selection to peer-to-peer backup.

Whichever Fastback – or Fastbacks – you specify, you'll be assured of the most efficient backups possible.

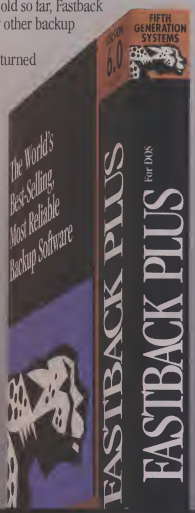
That's because all five versions deliver the ideal combination of speed *and* compression. Our latest Windows version, for example, achieves compression rates of up to 85% while backing up to QIC tape at over 10MBs per minute.

Clearly, we didn't call it Fastback for nothing.

Speaking of calling, if you'd like a copy – or a thousand copies – in your hands tomorrow, pick up the phone today.

Dial 800-999-2735.

And thanks a million.



FIFTH GENERATION SYSTEMS, INC.

Circle 738 on reader service card.

FASTBACK PLUS For UNIX

FASTBACK PLUS For the Macintosh

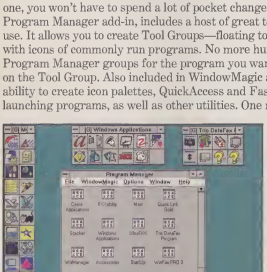
FASTBACK PLUS For Windows

FASTBACK PLUS For OS/2

PCContact

Power Up Program Manager With Mo' Better WindowMagic

Program Manager is no one's idea of a power tool, but if you want to turn it into one, you won't have to spend a lot of pocket change. WindowMagic, a shareware Program Manager add-in, includes a host of great tools to make Windows easier to use. It allows you to create Tool Groups—floating toolbars on the Windows desktop with icons of commonly run programs. No more hunting and pecking through Program Manager groups for the program you want to run: Just click on its icon on the Tool Group. Also included in WindowMagic are an icon collection, the ability to create icon palettes, QuickAccess and FastLaunch facilities for quickly launching programs, as well as other utilities. One nice thing about the program is that it doesn't replace Program Manager, but enhances it and works with it very intelligently. Download a copy of WindowMagic from PC/Contact, *PC/Computing*'s forum on the ZiffNet online service, as file WMAGIC.ZIP. Or contact the author at WinWear, 14150 NE 20th Ave., Suite 346, Bellevue, WA 98007. The registration fee for the program is a paltry $29.95.



Circle Reader Service No. 652

BEST SOFTWARE BUYS

Where can you get the best software deal? Usually through the mail. We surveyed mail-order houses and came up with the best prices we could find. The following prices include shipping and handling charges, but don't include credit-card surcharges. Prices are as of press time and are subject to change.

PRODUCT	LIST PRICE	BEST PRICE	SOURCE	READER SERVICE NO.
DOS 6.0 Upgrade	$99.95	$44.00	Egghead, (800) 344-4323	656
Excel 4.0	$495.00	$299.00	Computer Discwore, (800) 473-4239	657
Lotus 1-2-3 3.4	$595.00	$360.00	Bulldog, (800) 438-6039	658
Microsoft Word 6.0	$450.00	$298.00	Lomo, (800) 369-2846	659
Norton Utilities 7.0	$179.00	$105.00	Software Add-Ons, (800) 695-8088	660
QEMM-386	$99.95	$62.00	Software Add-Ons, (800) 695-8088	661
Quattro Pro 5.0	$49.95	$46.00	PC Zone, (800) 252-0386	662
Windows 3.1	$149.00	$92.00	Bulldog, (800) 438-6039; PC Zone, (800) 252-0386; Lomo, (800) 369-2846; Microwarehouse, (800) 367-7080; or Software Add-Ons, (800) 695-8088	663
Word for Windows 2.0	$495.00	$299.00	Lomo, (800) 369-2846; or Software Add-Ons, (800) 695-8088	664
WordPerfect 6.0	$495.00	$275.00	Lomo, (800) 369-2846	665
WordPerfect for Windows	$495.00	$256.00	ET Valueline, (800) 395-1000	666

Unbelievable Price On New Versions of Quattro Pro—$49.95

How low can spreadsheet prices go? As far as Borland is concerned, to rock bottom. The company has temporarily cut prices on the new Quattro Pro for DOS 5.0 and Quattro Pro for Windows 5.0 to $49.95. Current Quattro Pro users can upgrade for $39.95. The Windows version has new analytical tools, "Experts" to guide users through problem solving, and more. The DOS version now has notebooks, and Borland claims it runs on a machine as low-end as an 8088 with 512K of memory. Contact Borland at (800) 331-0877.

Circle No. 653 on Reader Service Card

Get Cut-Rate Prices On Harvard Graphics Competitive Upgrade

Looking for a powerful, Windows-based presentation program at cut-rate prices? Software Publishing Corporation has announced a temporary price drop on the competitive upgrade to the newest version of Harvard Graphics 2.0. If you have a competing presentation-graphics package, you can now get Harvard Graphics 2.0 for $89. If you wait until after December 31, you'll have to pay $125. For more information, contact Software Publishing at (800) 447-7991.

Circle No. 654 on Reader Service Card

Buy Volante Graphics Accelerator, Get CorelDraw Free

Buy a graphics accelerator card from Volante, and you get a free copy of CorelDraw 3.0. Volante's Warp10Plus card retails for $329 and includes 1MB of dynamic RAM. The Warp20 retails for $399 with 1MB of VRAM. The Warp20-2 retails for $489 with 2MB of VRAM. All three include CorelDraw. Contact Volante at (800) 253-8831.

Circle No. 655 on Reader Service Card

MULTI-MEDIA

See it as it should be seen...

*on a Texel DoubleSpeed **PLUS**™ Multimedia CD-ROM drive*

TO EXPERIENCE ***TRUE*** MULTIMEDIA - packed full of exciting video, animation, and stereo sound - consider the most important factor: a fast CD-ROM drive. While there are many CD-ROM drives on the market, most are inadequate when it comes to multimedia. To capture its true spirit, multimedia requires the performance of a *DoubleSpeed PLUS*™ drive.

Texel's *DoubleSpeed PLUS*™ drives are based on a proprietary motor technology that provides a faster data transfer rate over other "double speed" drives. *The higher the data transfer rate, the smoother and more natural motion looks on your screen.*

With a **data transfer rate of 335KB/sec**, Texel's CD-ROM drives offer higher performance and value — ***and*** you experience multimedia as it was *meant* to be. Plus, Texel's **240ms average access time** makes random access searches (used in encyclopedia's and databases) fly.

Texel's internal, external, bundle and tower drive configurations are all MPC-2™ compliant, multisession Kodak Photo CD™ capable and SCSI-2 compliant. This means you are buying the latest technology and are guaranteed compatibility.

Don't miss out on the thrill of multimedia because your drive can't keep up. Go beyond today's standard with Texel's *DoubleSpeed PLUS*™ drives. Anything less is obsolete.

335KB/sec
Data Transfer Rate

DoubleSpeed PLUS™

TEXEL

4255 Burton Drive Santa Clara CA 95054
Phone: 408.980.1838 Fax: 408.986.1010

Call 1.800.886.3935 for more information or a dealer near you.

Circle 252 on reader service card.

™ DoubleSpeed PLUS is a trademark of Texel, a subsidiary of Shinano Kenshi, Ltd., Japan. All other trademarks are owned by their respective holders.

Software Saleswire

WordPerfect 6.0 for DOS: No. 1 for the second month in a row.

Suite Tooth?
The only suite in the Top 10, Microsoft Office includes Word 2.0, Excel 4.0, PowerPoint 3.0, Access, and Mail for a fraction of the cost of purchasing the products separately.

BUSINESS APPLICATIONS	VENDOR	PRICE	COMMENTS	AUG	SEP
WordPerfect 6.0	WordPerfect	$495	A DOS app with WYSIWYG editing.	1	1
Access 1.1 for Windows	Microsoft	$495	Relational database, easy-to-use interface.	4	2
Office 3.0 for Windows	Microsoft	$750	Leader in the emerging suite category.	5	3
WordPerfect 5.2 for Windows	WordPerfect	$495	40 templates make formatting easy.	6	4
Excel 4.0 for Windows	Microsoft	$495	Has 16 Autoformat spreadsheet options.	3	5
Lotus 1-2-3 3.4	Lotus	$595	The old DOS favorite is faster than ever.	8	6
Lotus 1-2-3 4.0 for Windows	Lotus	$495	Context-sensitive menus make it easy.	2	7
WinFax Pro 3.0 for Windows	Delrina Tech.	$129	Fax, drawing, and document management.	9	8
Publisher 2.0 for Windows	Microsoft	$199	PageWizards guide you through design.	-	9
Procomm Plus 2.01	Datastorm	$129	15 file protocols and improved dialing.	7	10

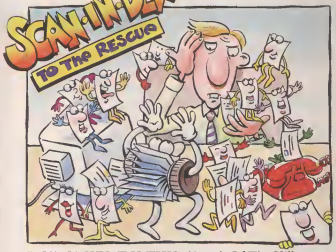
More Madness
As if one package of flying toasters isn't enough, Berkeley Systems' More After Dark joins the best-seller list.

UTILITIES	VENDOR	PRICE	COMMENTS	AUG	SEP
Windows 3.1	Microsoft	$149	Multitasking and WYSIWYG environment.	2	1
MS-DOS 6.0	Microsoft	$129	Now with built-in memory management.	1	2
OS/2 2.1	IBM	$249	Supports 32-bit graphics and multimedia.	3	3
QEMM-386 7.0	Quarterdeck	$100	Frees memory above the 640K barrier.	4	4
Norton Utilities 7.0	Symantec	$179	Recover data from compressed drives too.	6	5
After Dark 2.0 for Windows	Berkeley Systems	$50	Create a company logo screen saver.	5	6
NetWare 3.11	Novell	$1,095	The most popular PC networking choice.	-	7
More After Dark 2.0 for Windows	Berkeley Systems	$40	Offers 25 new screen savers, plus sound.	-	8
Hijaak Pro 2.0 for Windows	Inset Systems	$169	Supports PhotoCD and TIFF graphics.	8	9
Saber LAN Workstation	Saber Software	$179	A front end for Novell networks.	-	10

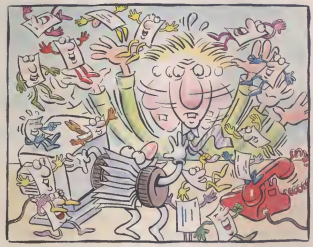
Figure It Out
At No. 4, Microsoft Money holds 18 percent of the personal financial software market, which includes No. 1 and No. 2 selling Quicken for Windows and DOS.

PERSONAL PRODUCTIVITY	VENDOR	PRICE	COMMENTS	AUG	SEP
Quicken 2.0 for Windows	Intuit	$70	Track balances, credit cards, and cash.	3	1
Quicken 6.0	Intuit	$60	DOS-based single-entry accounting.	2	2
Print Shop Deluxe 1.2	Broderbund	$80	Dazzling graphics, fonts, and headlines.	1	3
Money 2.0 for Windows	Microsoft	$70	Familiar metaphor: onscreen checkbook.	7	4
QuickBooks 1.01	Intuit	$140	Automate small-business accounting.	6	5
Print Shop Deluxe for Windows	Broderbund	$80	Includes hundreds of graphics and fonts.	9	6
CompuServe Windows Kit	CompuServe	$50	Access a plethora of services and forums.	4	7
QuickPay 2.0	Intuit	$60	Automates payroll for Quicken users.	10	8
Calendar Creator Plus for Windows	Spinnaker	$80	Schedule business and personal activities.	-	9
Calendar Creator Plus 5.0	Spinnaker	$70	DOS version of the popular scheduler.	5	10

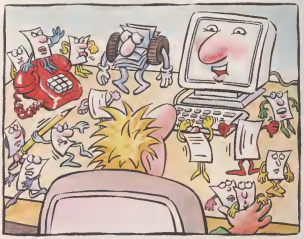
These software charts are compiled monthly by G. Meier, Inc., which gathers ranked-order sales information from the following software industry sources: 800-Software, ABCO Distributors; American Software; Babbages; Baker & Taylor Software, CompuAdd; CompUSA; Computer Discount Warehouse; Dustin Discount Software; Electronics Boutique; Gate/FA; Ingram-Micro; Kenfil; Merisel; Micro Warehouse, Multiple Zones; Navarre; PC Connection; Software Resource; Software Spectrum; Software, Etc.; and Waldensoftware. The rankings reflect sales of more than $6 billion of software through tens of thousands of resellers. A weighting system is applied to each entry based on three factors. the entry's position in the individual chart, the power of the contributing source based on annual gross sales, and the relative strength of a source in a given category of software All prices are suggested retail and are subject to change



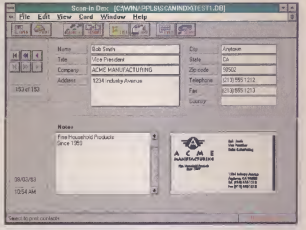
"#@!*#@!, WHAT IS THIS? 'Attack Of The Killer Business Cards'? They're everywhere ... and they're breeding. They multiply faster than my accountant!"



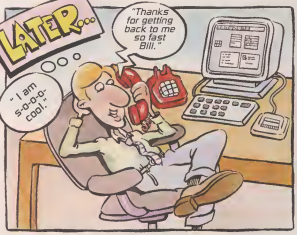
"They're attacking from all sides ... cards, card files and Rolodexes" ... t-r-taking over!! AGH, I'm losing it! Paper shredder ... yeah, that's the ticket, shred 'em, go for the kill. What a nightmare! HELLLLLLLLP!"



"Yo! Hey genius. Reee-lax. We know what's driving you looney, because it was driving us crazy too. That's why Microtek came up with the ***Scan-in-Dex*** ... Check it out."

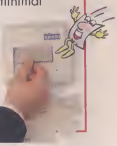


"***Scan-in-Dex***, scans, reads and records business card information in an electronic address book in seconds! Then you can print, search, or export the information. So what do you think Bub? Is this a solution to a problem or what?!"



Thanks to ***Scan-in-Dex***, no more business card clutter. Just an automatic, low cost way to organize business card information into your computer. Now Bill has it all together. Cool, calm and in touch, (well, sort of cool??).

Scan-in-Dex solves the business card dilemma by eliminating the need for cumbersome card files. For the first time, accessing business contacts from a computer is a realistic option for busy people, because it requires minimal typing. Scan-in-Dex comes to you from Microtek, the leader in affordable desktop scanning for over a decade. For more information on Scan-in-Dex or the name of your nearest Microtek retailer call, 1-800-654-4160.



MICROTEK
Better Images Through Innovation.

©1993 Microtek Lab, Inc. 680 Knox Street, Torrance, CA 90502. Microtek is a registered trademark of Microtek Lab, Inc.
All other trademarks whether registered or not are the property of their respective holders.

Circle 185 on reader service card.

Can the Glitz—Only Boring Computer TV Shows Will Win

HAVE YOU WATCHED SHOWS ON TV ABOUT COMPUTERS? IF SO, you haven't seen anything yet. Since the announcement by TCI Cablevision of a 500-channel national cable system, every Josephine who knows how to produce a TV show (and a few who don't) wants to start a channel dedicated to computer shows! Can you imagine? I've personally been involved in one pilot show and have been asked to be in two others. My best guess is that everyone who writes about the industry or has even a faint idea of what the word "pinout" means will be solicited. Specialty broadcasting is coming fast.

It's going to be bad enough with the 24-hour goat-herding channel, amazing-inventions channel, car-enthusiast channel, and 30 sports channels. In no time at all, though, there'll be two or three all-computer channels competing for the attention of computer nuts everywhere.

The joke of it is that you can be sure that the content won't be the key to any of these specialty channels. Why not? Because every unemployed producer is convinced that MTV is the model for special-interest programming. I've talked to a number of these jokers, and they're all working under a false premise. They fail to realize that the audience for these shows will want information, not entertainment—and information about computers can be pretty boring. In fact, when Bill Machrone was editing *PC Magazine* he'd always tell people that *PC Magazine* was boring and that readers loved it for *that* reason alone!

The boring, information-heavy shows are actually the wave of the future—not the MTV-style shows. MTV is pure entertainment. Are people really going to watch a computer show to be entertained? To illustrate why they won't, imagine the subject is fly-fishing. Assume you want to learn to tie flies. Would you want to watch a show that actually shows you how to tie flies step-by-step and tells you exactly what you need and how to buy what you need? Or would you prefer a cockeyed, camera-flashy, fast-paced show that delivers a lot of razzle-dazzle flies and a guy tying flies in quick clips, slam-bam-thank-you-ma'am style? You'd watch "Cops" before you'd watch that show.

The boring shows are a much better idea. Of course, when I say *boring* I don't mean moribund or deadly boring, like "MacTV." Have you seen this show? Its creators have no idea what is important, so they exaggerate the worst characteristics of another show, "Computer Chronicles." Both shows feature corporate zombies who drone on and on about uninteresting new products, detailing every useless feature. I was watching someone from Lotus the other day on "Computer Chronicles," and while this guy blathered on during a demo, he kept nervously moving the open window on the screen up a half-inch, then down a half-inch. Click click. Up a half-inch, down a half-inch. Click click. It was driving me nuts to watch this guy. Nothing that anyone does on these shows is *ever* questioned, including the endless and irritating readjustment of the screen.

Worse, a guest will make an assertion about some feature as if the feature were better than sex itself, and no comment is made. The shows are stagnant. At a trade show, when you see these same boring demos you can at least ask an intelligent question. The computer TV shows ask only questions that lead to the next level of boring drivel in the demo. No wonder the guests are always saying, "Glad you asked that" or "Good question." No host ever says, "Gee, that looks like an incredibly useless feature. Why did you do it?" You never know—some guests may actually have interesting answers to questions like that.

Still, unlike the giddy rah-rah boosterism of some syndicated computer-related TV shows (can you spell "NextStep"?)—which provide viewers with no real information (no price, product availability, or company name or address!)—viewers can glean some information from the "boring" shows. There is no question that the majority of interested technologists and early-adopter nuts actually prefer the bone-dry tedium and monotony of fact-oriented shows to anything else on television. Few card-carrying computer enthusiasts appreciate glitz anyway. Textbooks are their style, and boring shows are the textbooks of the airwaves.

So here are some ideas for you budding producers:

Computer Sports This show would highlight world-shaking events such as terminal tossing, a CPU-spitting contest—"How far can you spit a 386 chip?"—tower stacking, disk drive juggling, and more.

It's going to be bad enough with the 24-hour goat-herding channel.

Computer Trivia Game Shows In this type of program you could win thousands and thousands of dollars by knowing Grace Hopper's middle initial. Departing contestants would win a copy of Windows NT.

After-Hours Computer Sex An intimate live visit with "Mandy," the revved-up Chicago compu-bimbo, as she goes online. *You* might be next!

Computer Star Search Budding coders would show their wares in front of a studio audience. A panel would decide the winner in five categories: business software, games, utilities, networking, and general spokesnerd.

The airwaves will be filled with stuff like this. When it all shakes out, not much will change, and you'll still find that magazines are your best source of information. As always.

PHOTOGRAPH BY BUDY-HIRAKOSI

The ZEOS® ColorNote™ 486.

Incomparable Color, Unbelievable Value!

Standard with every ColorNote 486:

- 33MHz 486SX Intel CPU.
- RAM expandable to 20MB.
- IDE hard drive expandable to 170MB.
- 8K internal cache.
- Internal 3.5" 1.44MB floppy disk drive.
- PCMCIA slot supporting a type I, II or III device.
- 512K video RAM.
- Local bus video for super-fast 33MHz performance.
- Display: 640 x 480 dual scan color VGA backlit LCD, 9.4" diagonal, up to 256 colors.
- Supports an external SVGA color monitor at resolutions up to 1024 x 768, 16 colors or 800 x 600, 256 colors.
- 82-key keyboard with embedded numeric keypad and 12 dedicated function keys.
- Built-in trackball.
- Replaceable and rechargeable NiMH battery.
- One serial port, parallel port, keyboard port, mouse port and external video port.
- Full power management features include Low Power mode and programmable Stand-by features.
- AC adapter with full range from AC110-240V to DC.
- 8.54" x 11.65" x 1.5"; 5.6 lbs.
- FCC Certified Class B; UL Listed.
- Complete ZEOS Customer Satisfaction Package.

ZEOS's new ColorNote 486 starts with a powerful, reliable Intel 486SX processor operating at 33MHz—not just 25MHz like many other color notebooks. And we added local bus video for super-fast 33MHz video performance. We've packed in enough power and memory to easily run Windows: 4MB RAM (expandable to 20MB), an 80, 120 or 170MB hard drive, and an 8K built-in cache—standard.

COLOR JUST LIKE A GREAT DESKTOP MONITOR.

For a crisp, vibrant color VGA display, the ColorNote employs a new technological breakthrough—dual scan technology—for color that's much better than standard passive matrix, yet not as expensive as active matrix. You get color that's comparable to that of a great desktop color monitor! What's more, your screen is backlit, 9.4 inches on the diagonal, and gives you up to 256 colors.

PLENTY OF POWER—PLUS A PCMCIA SLOT!

Color technology can drain a notebook's power. So that you can get up to three hours—and beyond—of battery life, the ColorNote uses a Nickel-Metal Hydride battery. It also comes equipped with an internal 1.44MB floppy drive and PCMCIA slot. All this—and the ColorNote weighs a mere 5.6 pounds, including the battery!

AWARD-WINNING SERVICE & SUPPORT.

We're the only company to win *PC Magazine's* Readers' Choice for Service and Reliability—for both desktops and notebooks—*twice!*

SERVICE & RELIABILITY — PC MAGAZINE — READERS' CHOICE

TOLL-FREE TECH SUPPORT, WARRANTIES & GUARANTEES.

We're here for you 24 hours a day, 365 days a year, and always a toll-free phone away.

All ZEOS systems come with a One Year Limited Warranty and a 30-Day Money-Back Guarantee. You're going to be very satisfied. *We guarantee it!*

In ordinary passive matrix displays (inset photo), colors are less saturated, and fading at the edges is common. With dual scan technology (on screen), color is richer, more uniform—with quality comparable to a great desktop monitor.

PACKAGE 1

ColorNote 486: $2395

- 4MB RAM
- 80MB IDE hard drive

PACKAGE 2

ColorNote 486: $2695

- 4MB RAM
- 120MB IDE hard drive
- MS-DOS 6
- Microsoft Windows 3.1
- Lotus Organizer

PACKAGE 3

ColorNote 486: $2995

- 8MB RAM
- 170MB IDE hard drive
- Custom leather carrying case
- MS-DOS 6
- Microsoft Windows 3.1
- Lotus Organizer

CALL NOW TOLL FREE

800-554-5218

24 HOURS A DAY

Fax Orders: 612-633-1325, Government: 800-245-2449, Hearing Impaired (TDD): 800-228-5389, Outside U.S. and Canada: 612-633-6131, Purchase Orders, MasterCard, VISA, Discover, Am Ex, Z-Card,™ COD and affordable leasing programs. Open 24 Hours a Day, 365 Days a Year!

Purchase orders are subject to approval. Business leasing programs available. All prices, specifications and availability are subject to change without notice; call to confirm these and warranty details. Prices do not include shipping. All products and company names are trademarks or registered trademarks of their respective holders. ZEOS is a registered trademark. ZCard™ is a registered service mark. ColorNote is a trademark of ZEOS International, Ltd. © 1993 ZEOS International, Ltd. 1440 Industrial Blvd. Minneapolis, MN 55413 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS). CB/PCL-4931

ZEOS INTERNATIONAL, LTD.

Circle 170 on reader service card.

It's Extremely Heavy. It's My Graphically Superb Org Chart

WALT CAME INTO MY OFFICE THE OTHER DAY AND CLOSED the door. Walt is my boss, and when he closes the door that way it means only one thing: Somebody is toast. Turns out I was right. We're reengineering again, implementing another of the healthy, cleansing reorganizations we indulge in around here once every six to eight months or so. While this puts tremendous pressure on the individuals who are part of this enforced weight-loss program, it's a bonanza for the bureaucrats whose job it is to construct new org charts, and the software providers who respond to their needs. The good news in this branch of the reengineered tree is, I am that person.

I had no idea, however, just how powerful org chart software truly is until I began to assemble the physical manifestation of our new pecking order.

I started out as I always had in the past, with Harvard Graphics for DOS, which, in addition to creating excellent bar, area, and 3-D line charts that do not crash and burn when their memory fails them, makes good org charts, too. The issue I hadn't yet come to terms with was that in the current reorg, Walt had decided to eliminate an entire layer of middle management and assign all viable life forms to himself.

"Start from scratch, with me at the top, and build a reporting structure in which all players are essentially equal," Walt said in his customarily warm and avuncular tone. So, of course, that's what I did. I put the Waltster at the top, with his title beneath, then entered each of us at headquarters and in the field who, former serfs of a wide range of suddenly dead managers, now reported directly to the head cheese himself. I worked in the text menu, entering and editing entries easily. Then I pressed F2 to render the chart.

That's when it happened. I should have known it would. Where before there was a complex vertical tree of interlocking duties and fealties, now there was nothing but a gigantic top box hovering over a flat, undifferentiated plain of equal functions. Each of those boxes was minuscule, the type within of submolecular weeniness. As I noted this, I abruptly felt my own physical presence shrinking at an alarming rate. The objects on my blotter zoomed past my widening eyes, then the top of my desk, then the wires beneath. I looked up and saw my power strip looming above me like a vast mountain range. I screamed. Then I blacked out.

I came to a few moments later. Meredith, our office manager who hails from Hamburg (which is still in whatever is left of Germany), was fanning my face with a copy of our 1993-1996 strategic plan. "You vas not dere, den I press der computer and you vas!" she said. I thanked her very much and ushered her to my door. My head, now back to its normal, puffed-up size, was spinning. It was clear that, as part of this organization chart, I had to be careful. Programs that produced tiny function boxes and offered minimal command of font size had to be used sparingly, and even then with extraordinary care.

I moved over to a program that Fritz, our Human Resource benefits guy, had recommended recently, Micrografx OrgChart Plus. This was something different altogether. While the interface was a little unwieldy at first, I seemed to be having good luck fitting all of us into the required power relationships that Walt envisioned. All seemed to be well. I even considered scanning in some thumbnail portraits of each of us, just to wow the old man a little. I created a new box style for the chart, and shaded the backgrounds neatly. "This is a tasty solution to a tough operational problem, done with Micrografx's customary style and customer focus," I said to myself, and then stopped short. I don't talk that way, not usually. My phone rang.

"I was wondering if you'd like to interface over a sandwich," said an oddly metallic voice at the other end of the line. It was Beaver, whose normal salutation was "Hey! Dude!" Something was off.

"Beav," I said. "What are you wearing?"

"Funny you ask," said the Beav. "I thought I wore my black-and-white herringbone, blue shirt, and corporately approved dog-barf tie. Instead, I find I'm dressed from head to foot in gray worsted. My shirt is white. My tie! My tie is . . . yellow . . . with little blue dots. . . . I gotta go."

He hung up. I looked down at myself. I was wearing the same thing. I looked at my reflection off the tinted, hermetically sealed glass that passes for a window up here. My features had shifted subtly, but unmistakably. Normalized in some way. I poked my head out my door and called for Giangreco, my neighbor. He poked his head out. The good news is that for the first time in years, he had hair. The bad news is that it was my hair exactly. "My expense account seems to have shrunk to the size of yours," he said, and disappeared. It was clear: If this didn't stop, in very short time everyone on that chart would be completely undifferentiated from the others.

The man who runs the org chart rules the world. You got that?

I carefully closed the document, saving it for the time when it might be necessary (there are occasions when it doesn't pay to stick out of the underbrush, you know), and I opened Shapeware's Visio. Visio is mysterious. You manipulate objects in various spatial relationships, linking them to each other and sort of exploring the negative space between them. I loved it from the moment I popped its shrink wrap. But I

PHOTOGRAPH BY EDWARD HOPPER ©TIA

NEW Q&A FOR WINDOWS. THE FIRST DATABASE BUILT FOR THE FORTUNE 5,000,000.

Symantec introduces Q&A for Windows. The first Windows database and word processor specifically designed for people who have a small business to run.

People who have customers to serve, invoices to track, inventory to manage, correspondence to stay on top of, and a thousand other daily tasks to perform. People who simply don't have the time to learn the ins-and-outs of database programming. Or the budget for a computer support staff. In short, the people who need a database most.

Q&A's unique spreadsheet view lets you view files and lists in a familiar row and column format. Flexible reporting allows you to create everything from phone lists to invoices in mere seconds. And a full-featured word processor – complete with a spell checker and thesaurus – gives Q&A the industry's fastest and easiest mail-merge.

As a special introductory offer we've packaged new Q&A for Windows with Broderbund's The Print Shop® Deluxe. Which means you get a complete database, word processing and business graphics solution in one easy-to-use, low-cost bundle.

Pick up Q&A for Windows at your local software retailer today or call 1-800-628-4777 ext. AC33 for more information.

Do it now. And start climbing up that list of FORTUNE® 5,000,000.

SYMANTEC.™

For sales information, call 1-800-441-7234 in Canada and 1-416-367-4532. For more information, call 408-253-9600. Q&A and Symantec are registered trademarks of Symantec Corporation. The names of other products are trademarks or registered trademarks of their respective holders. ©1993 Symantec Corporation. All rights reserved.

Circle 140 on reader service card.

hadn't figured out what the heck it was good for except in the construction of charming cityscapes.

Walt's last words rang in my ears: "What we've really got here is a spoke of related functions, with me at the center. But I don't know how in the hell you're going to achieve that."

But of course! That's what Visio is for! I placed an executive box in the heart of my grid. I put satellites orbiting the death star peopled by myself, Lazenby, Orkin, Stutz, Lemur, and Nofziger. It was working!

Off our pods I added our support staff and dotted-line folks, and wow! Here was not a flat org chart of the 1950s at all, but a new, flexible, interlocking matrix of power thoroughly reflective of the realities of the '90s!

Stutz stuck his fat head into my doorway. I don't like Stutz, never have. Stutz has spent a considerable amount of time sucking up to my bosses at virtually every chance he gets. At last year's general manager's convention, for instance, he implied that the color selection on our multiscreen slide show was somehow lacking, in front of a group that knew all too well that I had chosen that combination of bright green and orange (which I think looked quite good together). Besides, Stutz is an obvious, blatant toady, a quality that offends my commitment to subtlety and finesse in these matters.

"Walt told me to tell you he's waiting for that chart, and you had better not plan on going out to one of your famous lunches until the job is done," he said.

"You know, Mel," I said quietly, "I don't need to hear that from you, man." As I delivered this message, I seized Stutz's box with my mouse pointer and ripped it out of the organizational wagon wheel, heaving it off to one side and way down, almost off the page altogether. He was still connected to the org, because Visio does that automatically, and it's a good thing, too. I was annoyed.

"*Aieeeee!!!*" screamed Stutz as the vortex sucked him backward and down the hall. I calmly followed the sound of his weeping and snuffling to the farthest corner of our floor, where I discovered him in an empty office, his back plastered to the window some 11 feet above the ground, sort of hanging there in what must have been an extremely uncomfortable position.

"I'm gonna let you down in a minute, Mel," I said. "But before I do, I want you to remember one thing."

"Anything, man, anything!" He was pathetic.

"The man who runs the org chart rules the world," I said. "You got that?"

He did. I'm glad I didn't make him disappear altogether. He's an OK guy when he's got a few drinks in him. And besides, I've got a lot of powerful software on my system. I'd like to think I control it, not the other way around. ◤

Visit us at Comdex Room #LN102

No Noise, No Hassle. Just SCREAMER Prices!

DataPort™ 14.4/Fax Modem with Exclusive optical and cellular technology!

$209 Est. retail price PC internal card

You get *no noise* from AT&T's Optical Line Interface* (OLI™), just the fastest speeds possible on good or bad phone lines. You get *no hassle* either, with AT&T's Enhanced Throughput Cellular (ETC™) protocol,* just the fastest speeds when connected to a cellular call.

- V.32bis/V.17 (sends/receives 14,400 bps data and fax)
- V.42bis/MNP 5 (data compression, error correction)
- 16550A buffered UART for PC internal card
- Increased first time connectivity and optimal speed using OLI and ETC
- Background faxing
- Auto data/fax discrimination
- Backed by AT&T for as long as you own it
  - Lifetime warranty and TOLL-FREE technical support

$239	Est. retail price for PC external
$249	Est. retail price for Mac external

Includes QuickLink II comm/fax software for DOS and Windows or the Mac. Mac version also has serial port cable.

Visit Computer City, Fry's, and Elek-Tek for exciting low prices! Or for the name of other dealers near you, or to order the DataPort 14.4/Fax Modem directly, call now:
1 800 554-4996 ext. 48011

AT&T

For End User Circle 191 on reader service card.
For Reseller Circle 192 on reader service card.

* Patent pending. © 1993 AT&T. DataPort, OLI, and ETC are trademarks of AT&T. All other products or services mentioned are the trademarks, service marks, registered trademarks, or registered service marks of their respective owners. Lifetime warranty is limited and applies to original purchaser only.

Introducing two new power hitters that cover all the bases.

Create high-powered queries, reports and graphs with the click of a mouse!

PowerViewer™ lets you access virtually any database to create sophisticated, multi-table reports with *integrated business graphics*. The built-in **QuickStyles** let you format your data in just about any style instantly — without programming. And the exclusive **Connect Profiles** enable you to move between two or more databases with just a mouseclick. Plus Powersoft's exclusive **Database Connection Hotline** is there if you have any questions.

PowerViewer

$139 $49 LIMITED TIME OFFER

Create your own sophisticated database applications in minutes!

If you want even more power, PowerMaker™ gives you everything you get in PowerViewer plus the ability to create custom multi-table applications against multiple databases easily and graphically. You can connect to all supported databases, but you also get a *powerful built-in relational database*, WATCOM SQL. And once you've built your masterpiece Windows applications, you can distribute them with absolutely *no user runtime fees*.

PowerMaker

$349 $99 LIMITED TIME OFFER

TAKE ADVANTAGE OF THESE SPECIAL INTRODUCTORY PRICES NOW!

CALL YOUR CORPORATE RESELLER, STOP BY COMPUSA OR PHONE POWERSOFT DIRECT.

CALL 1-800-273-2841 TODAY.

From the makers of PowerBuilder Product of the Year 1992 Infoworld

Powersoft.

A new kind of power for a new kind of computing

POWERSOFT ENTERPRISE SERIES

Powersoft Corporation, 70 Blanchard Road, Burlington, MA 01803

Prices listed do not include sales tax, shipping and handling. All trademarks and registered trademarks are property of their respective owners.

Circle 214 on reader service card.

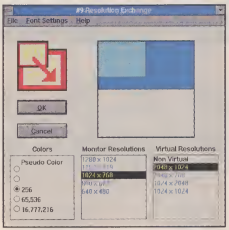
GET A VIRTUAL
VIRTUALLY E

Virtual screen technology is like having two monitors in one. Create the mother of all spreadsheets. Run PageMaker and Excel side-by-side. Use your monitor as a viewfinder and pan across to the place you want to be. All it takes to upgrade to a 2048 x 1024 virtual screen is just 2MB of optional RAM (1MB VRAM, 1MB DRAM).

Our chameleon cursor can change size and color so it never gets lost. So you never have to play that frustrating game of hide-and-seek.

†Performance measured by running WinBench 3.11 at 1024 x 768, 256 colors, using #9GXE Display Driver 9. Dell system configured with 66MHz 486DX2 processor, 16MB RAM and 256KB cache. VL-Bus is a trademark. Names of others. ©1993 Dell Computer Corporation. All rights reserved.

SCREEN WITH VERYTHING.



Our Resolution Exchange Panel gives you complete control over your desktop environment. And since the VL-Bus links video directly to your powerful 486DX2, your commands are executed instantly.

**Resolution Exchange Panel and Hawkeye Zoom examples given for #9GXE configured with 3MB RAM (2MB VRAM, 1MB DRAM), and 1280 x 1024 monitor.*

Our Hawkeye Zoom Feature gives you up to four levels of magnification. So you can really see the details of what you're working on.*

ORIGINAL SIZE

If you want to plug in a mouse, Dell gives you a dedicated mouse port.

If you open up your Dell Dimension™ XPS PC, inside you'll find a #9GXE video card. This fast and versatile video card uses the VL-Bus™ and ultra high-speed video RAM to give you the video ride of your life.

A Dell Dimension XPS PC configured with our #9GXE video card (with 1MB Video RAM) delivers 26 million WINMARKS! Or with our optional 2MB RAM upgrade (1MB VRAM, 1MB DRAM), it delivers a face-warping 33 million WINMARKS! Either way, we're talking incredibly fast.

But raw speed is just part of the Dell Dimension XPS story.

The Dell Dimension XPS's #9GXE video engine can be accessed on-screen via a control panel that allows you to configure a host of powerful utilities to give you total control of your desktop video environment.

Add our optional 2MB RAM upgrade and you have the power to switch your #9GXE to a virtual screen with a resolution of up to 2048 x 1024 pixels. Very cool.

This versatile add-in effectively gives you the desktop equivalent of two monitors. So you can have two full-size applications, like Excel and PageMaker, displayed side-by-side.

The virtual screen allows you to seamlessly pan across your monitor from application to application.

When you need a closer view of your work, press a "hot key" and you can zoom in and out with four levels of magnification.*

Working against color backgrounds? Our chameleon cursor can change size and color so it never gets lost.

You can also create a whole library of time-saving "hot keys" for all of your applications.

When it comes to video and video-related utilities, Dell Dimension XPS PCs are your ticket to ride.

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

DELL™

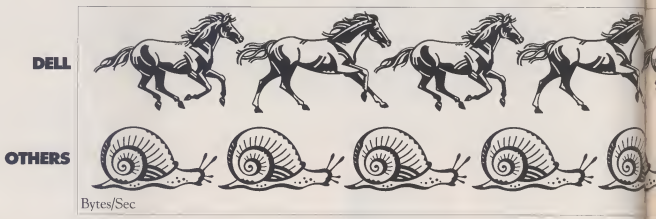
TO ORDER, CALL

800-925-0188

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA, CALL 800-668-3021. PLEASE REFERENCE #11XBU

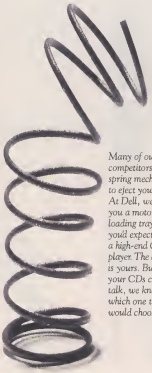
of Video Electronics Standards Association. Dell disclaims proprietary interest in the marks and

FAST VS HALF-



With faster access and nearly double the data transfer rate our double-spin CD ROM makes others seem positively sluggish.

Thanks to our multi-session CD technology, you can have the disk printed on up to four different times, storing up to 100 color photographs in all.

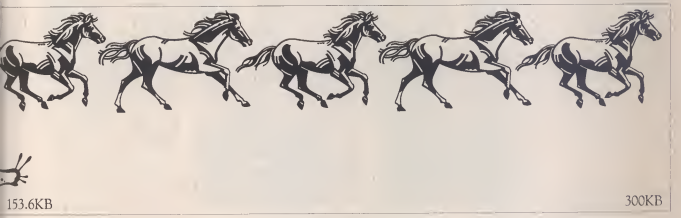


Many of our competitors use a spring mechanism to eject your disks. At Dell, we give you a motorized loading tray like you'd expect from a high-end CD player. The choice is yours. But if your CDs could talk, we know which one they would choose.

Whistle while you work. Or tap your foot. Or sing along. Our audio center CD ROM software lets you play disc jockey while you carry on with the important work of the day.

*All comparisons based on manufacturers' specifications. The Dell CD ROM is the Panasonic 563. Other CD ROMs compared are LMSI CM205 and Sony CDU-31A. Dell disclaims proprietary interest in the marks and names of others.

CDs FAST CDs.



When you buy a Dell Dimension™ XPS 450V or 466V equipped with a CD ROM, you get a CD ROM drive that runs circles around our competition.*

Thanks to advanced dual-spin technology, our CD ROM gives you an access time of just 350ms and a data transfer rate of 300KB per second. That's nearly twice the performance of many of our competitors.

And that's just the start.

Our drive has the automatic, push-button motorized tray you'd expect to find on a high-end CD player.

Compare that to the manual spring-load reject, uh, eject button from many of our competitors. It's still push-button, but your CDs don't glide effortlessly. In fact, they don't glide at all.

Ours is obviously a lot easier and more pleasant to use. And our CD ROM drive is built to last.

Our CD ROM is Kodak Photo-CD compatible. Which means you can take advantage of the latest in CD technology and view photographs on your PC screen. What's more, our CD drive is multi-session. Which means you can have the disk printed on up to four different times. Storing up to 100 pictures in all. Keeping them in perfect condition with no fading.

Our CD ROM also comes with software that lets you play your favorite audio CDs while you work.

So you can listen to Mozart as you crunch numbers or bop along to the Beatles as you cruise your local BBS.

Sound like a better drive for your money? It is.

So if you want the best CD ROM technology for your money, make a fast decision and call Dell today.

After all, there's absolutely no reason why you should settle for a CD ROM that's behind the times.

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

DELL™

TO ORDER, CALL

800-247-4617

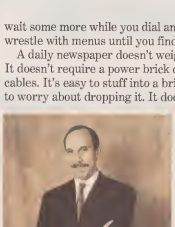
HOURS MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT

IN CANADA, CALL 800-668-3021. PLEASE REFERENCE **#11X8V**

©1993 Dell Computer Corporation All rights reserved.

Sure, Paper Publishing Is Evil Waste, But Media Junkies Prefer It

IS PRINT DEAD? DYING? SUDDENLY, EVERYONE IS ONLINE. Funky radio stations in the San Francisco Bay Area advertise their Internet addresses. And now more than a dozen newspapers are available via modem. Will PCs soon provide our information fix? John and Paul battle it out.



SOMERSON: Sooner or later the political correctness Nazis are going to zero in on newsprint. And then we'll all be struggling to read our news off a CRT. Of course, this assumes that future generations will still know how to read.

DVORAK: Oh brother, there you go again. You purport to be a big booster of technology and now you show your true colors: those of a Luddite. Don't you think it's about time something was done about the millions of trees destroyed just to print the *L.A. Times?* It's ridiculous. I'd rather read some things off the CRT. I don't have a problem with it.

SOMERSON: Get real, John. No caring person wants to clear-cut the rain forest or turn old-growth redwoods into toilet tissue. But today a lot of printing paper comes from pulp farms, not national parks. More should. It's a crop. Farmers plant it and harvest it. Nothing wrong with that.

What is wrong is that magazine issues are becoming political issues. Like you, the political correctness mind police are wringing their hands about the evil waste in publishing anything on paper. But the truth is that computers just aren't ready to replace print. Ever try to read a newspaper on a CRT? Or a novel? It doesn't work. Yet. Most current attempts by major newspaper publishers end up being adjuncts rather than replacements, offering information on vital topics like school lunch menus.

Be honest—with the present state of electronic distribution, could even a major online junkie like you suddenly swear off all printed books, magazines, and newspapers cold turkey?

DVORAK: Nothing beats a paperback for ease of use and portability—I agree. But beyond that, the electronic media does a better job of it and the readability isn't that bad.

SOMERSON: Geez, you just dismissed three of the main reasons why print works and PCs don't—usability, portability, and readability. You don't have to turn a newspaper on, wait for it to boot, load an application, and wait some more while you dial and then log on and then wrestle with menus until you find what you're looking for.

A daily newspaper doesn't weigh seven pounds. It's cheap. It doesn't require a power brick or a tangle of plugs and cables. It's easy to stuff into a briefcase and you don't have to worry about dropping it. It doesn't start beeping at you and run out of juice on a long airplane flight. It's easy to skim, and you can easily jump around inside stories or from one story to another.

DVORAK: Have you ever weighed the Sunday *L.A. Times?* And easy to skim? Give me a break.

SOMERSON: No way. The first thing people do when they open the Sunday *L.A. Times* or *New York Times* is toss four pounds of Kmart ads and sections they don't read. Besides, the Sunday papers are built for skimming because they're so big; all the material is arranged by section, and all the sections are indexed.

Sorry, but you have it backward, John. Newspapers are a snap to read. Your statement that the readability of electronic media "isn't that bad" is dead wrong. Maybe users have a prayer with a big, fast 1,280-by-1,024 desktop screen with all the right fonts. But on anything smaller, poring over so much text just doesn't work. All of today's portables max out at a very unreadable 640-by-480 resolution. A tiny window like this is too small for comfort.

DVORAK: Maybe you need glasses. What's particularly good about electronic media, however, is searchability. Every book becomes a database. If there is a problem with that then it's a sociological problem, not a mechanical one. People will read only selected items and not browse around like they do today. Newspapers will become the same thing—searchable—and thus ruin the newspaper experience.

SOMERSON: Finally we agree. Tens of millions of readers enjoy the distinct nonlinear, serendipitous, random-access joy of perusing paper pages. This would be lost. So would the physical experience—the ability to lean back in a comfortable chair and hold the paper over your head.

You're also right about the potential searching power of electronic retrieval. But this cuts two ways. It's true that users can tell a database to hunt down every reference to a particular topic and have the search engine queue them all up, but the results are often unusable. Today's clanky

PHOTOGRAPHS BY ROBIN MAA FOR AND RICHARD WORKMAN

PERFORMANCE MACHINES THAT BLOW THE GATES OFF GATEWAY.

DELL DIMENSION™ 433SV i486™ SX 33MHz SYSTEM

$1,499† | BUSINESS LEASE◊ $55/MO.

- 4MB RAM
- 64MB MAX RAM
- 170MB (17ms) HARD DRIVE
- UPGRADEABLE TO PENTIUM™ OVERDRIVE™
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 2 ON VL-BUS™
- ACCELERATED LOCAL BUS VIDEO
- ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)
- DUAL DISKETTE DRIVES (3.5" AND 5.25")
- SPACESAVER KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE

ALSO AVAILABLE IN 33MHz i486 DX FOR $1,999† BUSINESS LEASE: $74/MO. SYSTEM INCLUDES ABOVE, PLUS: 8MB RAM, 230MB (17ms) HARD DRIVE AND ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI).

† *Promotional price expires 11/5/93.*

DELL DIMENSION XPS 450V i486 DX2 50MHz SYSTEM

$2,799† | BUSINESS LEASE $104/MO.

- 8MB RAM
- 64MB MAX RAM
- 230MB (17ms) HARD DRIVE
- **128KB SECOND LEVEL EXTERNAL CACHE**
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- **VL #9GXE VIDEO ACCELERATOR CARD WITH VIDEO CONTROL PANEL SOFTWARE**
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5")
- SPACESAVER KEYBOARD
- **MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE**
- **SOUNDBLASTER 16-BIT SOUND CARD, AMPLIFIED SPEAKERS, MICROPHONE**
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

DELL DIMENSION XPS 466V MULTIMEDIA i486 DX2 66MHz SYSTEM

$2,999† | BUSINESS LEASE $111/MO.

- 8MB RAM
- 64MB MAX RAM
- 320MB (17ms) HARD DRIVE
- **128KB SECOND LEVEL EXTERNAL CACHE**
- UPGRADEABLE TO PENTIUM OVERDRIVE
- 5 16-BIT ISA EXPANSION SLOTS AVAILABLE, 1 ON VL-BUS
- **VL #9GXE VIDEO ACCELERATOR CARD WITH VIDEO CONTROL PANEL SOFTWARE**
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5")
- SPACESAVER KEYBOARD
- **MULTI-SESSION, DOUBLE-SPIN CD ROM DRIVE**
- **SOUNDBLASTER 16-BIT SOUND CARD, AMPLIFIED SPEAKERS, MICROPHONE**
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

DELL DIMENSION XPS. PCs DESIGNED FOR THE HIGH PERFORMANCE USER.

Now that you have been a witness to the impressive technological advancements of the Dell Dimension XPS PCs, there are only two small decisions you have left to make. And they're both easy ones:

Which Dell Dimension XPS PC is the right computer for you?

And what kind of software would you like to go with it?

That's right. You can order your software at the same time you order your Dell Dimension PC. That way, you'll be up and running the minute you open the box and unpack your system.

Purchase any combination from 100 of the most popular and competitively priced MS-DOS and Windows applications and have them pre-loaded onto your machine for one flat $15 installation fee per system. Now that's a really good deal.

And should you ever feel the need to add a peripheral, upgrade a software package or order a new application, we're ready and able to help you there too. With our DellWare™ program. A great selection of more than 2,400 software and peripheral items that you can order direct from us at discount prices. And if you want your DellWare selections in a real hurry, we'll ship your order to you overnight for only $5 extra. For no charge at all, we'll send you a free DellWare catalog.

Now if there's anything else we can do for you, just pick up the phone and call.

intel inside

DELL™

TO ORDER, CALL

800-348-8356

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-5PM CT SUN 12PM-5PM CT

IN CANADA* CALL 800-668-3021 PLEASE REFERENCE #11XBW

*Prices valid in the U.S. only. Some products and promotions not available in Canada. ◊Business leasing arranged by Leasing Group, Inc. The Intel Inside logo is a registered trademark and i486, Pentium and Overdrive are trademarks of Intel Corporation. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation. VL-Bus is a trademark of Video Electronics Standards Association. Dell disclaims proprietary interest in the marks and names of others. ©1993 Dell Computer Corporation. All rights reserved.

search engines are OK for academics and researchers. But they overwhelm most readers. Give a large database a topic and the search might uncover thousands of references. A user concerned about developments in the Middle East might look for the word *Jordan* and end up with dozens of articles about the Chicago Bulls.

DVORAK: That's beside the point. And it will be resolved. Newspaper publishers know that once the newspaper experience is gone, they're history. Macy's won't run a big spread in an electronic newspaper, that's for sure. Today's newspaper is a vehicle for advertising, and the publishers are reluctant to change the formula that they've painted themselves into a corner with.

SOMERSON: Wrong. Not only will Macy's want to run ads on electronic media, but it will also be able to target prospective buyers with far more precision than it can in a newspaper.

DVORAK: Are you nuts? This is exactly why Prodigy hasn't taken off. Who wants to see electronic ads? Nobody looks at them. How are you going to insert them into the database? When you search for *Peru*, will a screen suddenly appear saying, "We're about to find Peru for you. Before we do we want to tell you about a great sale on asparagus at the Winn-Dixie market." That will go over like a lead balloon.

SOMERSON: Duh. That's not why Prodigy isn't doing well. Now let's think. Could slow, ugly screens possibly be a reason? Or how about nutty, uptight censorship? Or an interface that's about as friendly as a tax form?

But you're proving my point. You just can't easily read a sea of text onscreen. However, when this stuff gets bigger and faster, things will be different. Face it—when the country gets wired properly we'll be able to view TV-like commercials on our PC screens if we want to. You can bank on it. And we'll be able to filter out the ones we don't want. In the market for a sports car? Then tell it just to let you view ads for two-seaters.

What will really get Macy's excited about running online ads is the ability to "customcast." Credit-card companies and other electronic information providers will be able to track your buying habits and instantly let advertisers know that you're a hot prospect. Order a mattress and Macy's will want to sell you sheets. Even more insidious, because there's no federal law prohibiting digital eavesdropping, if you happen to e-mail to a friend that you're getting married or buying a house, the online service can inundate you with related sales offers for furniture or flowers. *E-mail privacy* is as much an oxymoron as *business ethics* or *civil service worker*.

DVORAK: Whine all you want. As far as I can tell, there is nothing to stop the move from print to electronic newspapers once someone creates an electronic classified advertising section that's better than the current newspaper classifieds. This is the key ignored by the media prognosticators and people like the dogmatists at the MIT Media Lab who like to show how much better a classified ad is on a computer. "Look, you can search with a keyword: *Buick!*" They ignore that the classified ad section is a total experience.

SOMERSON: Actually, in the future, electronic newspapers will have a big technical edge on wood-based ones. News can be far more up-to-the-minute. Inevitable reporting mistakes can be corrected instantly. Hypertexty abilities can let you drill down and get additional information on any topic, then jump back to where you started. Filters can screen out unwanted data. You'll be able to see video clips instead of still photos. Threads will let you track news backward if you missed something earlier. You can write letters to an editor on the spot, and even have dialogues with columnists. Once electronic classifieds reach critical mass, their paper counterparts will seem archaic and useless.

But this won't happen with the present primitive state of PC display and data-handling abilities.

DVORAK: Sheesh. Now you're agreeing with me. It doesn't work with classified ads though.

SOMERSON: Hey, John, I said "in the future." It's not even close today. Instead, state-of-the-art stuff these days ends up being Prodigy-quality.

But hold on. You're flip-flopping again. Electronic classifieds sound too good to be true. Right now if you want to sell something in a Sunday paper you have to place the ad by Thursday. If you're selling a house you can't show the modern appliances in the kitchen, or the view out the living room window. If you're job hunting, you can't attach your resume. And you're limited to one local paper's reach at a time.

With digital classifieds it's a new world. You can advertise something at 1:00 and sell it at 1:05. Once you enter an ad it doesn't cost much to keep it alive for days or months. You can attach all sorts of documents or video clips. You can have the database instantly beep or phone or fax you when it finds a match. With one keystroke you can search nationally, not just locally. And as with stock-market software, you can have the ad make unattended purchases or sales, handle credit information, and arrange for shipment.

So, with 100 million PCs and 40 million modems, why isn't there a centralized electronic classified operation?

Macy's won't run a big spread in an electronic newspaper, that's for sure.

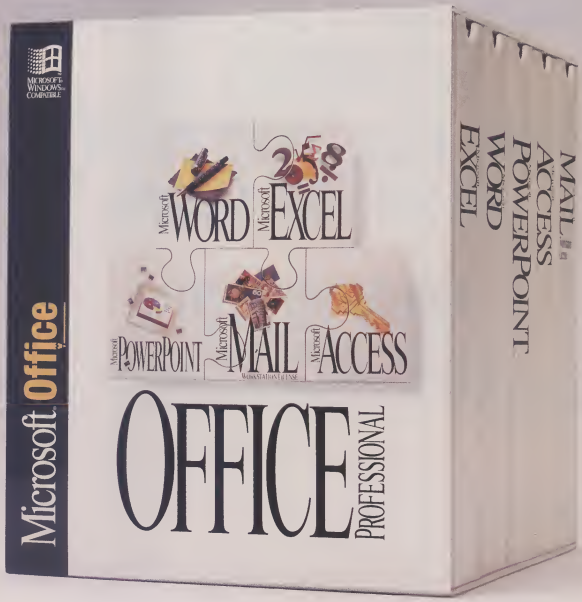
DVORAK: Classified ad readers do high-speed browsing to find things they didn't know that they wanted to buy. Things they can't look up with a keyword. No software can duplicate the experience—yet. But someone will dream up something someday. I'm sure of it.

SOMERSON: Great. Knock yourself out doing some high-speed browsing through classified sections like "Mobile Home Park Sites" and "Feed Lot Rental." Me, I'll wait until they get the CRTs big enough, the interface right, and the delivery system fast enough. Better yet, I'll hold out for the next generation of giant, detachable, high-resolution flat-screen displays from companies like Toshiba and Samsung. Until then, please don't cancel my subscription to the *New York Times*... ◩

IN 1990,
MICROSOFT INTRODUCED
WINDOWS 3.0,
AND PCs HAVE NEVER
BEEN THE SAME.

NOW HISTORY
REPEATS ITSELF.

INTRODUCING THE MICROSOFT OFFICE. A WHOLE NEW WAY TO WORK.

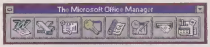


You asked for programs that work more like you do. And the new Microsoft® Office delivers on a level that software never did before.

We've gone right to the core of all our renowned programs for Windows™ and evolved them into a single, intelligent, effortless working environment. Now you can focus on your work, not your computer.

You've helped us create all the best innovations.

The Microsoft Office couldn't have happened without a lot of concrete feedback from you. We've studied how you work and used your suggestions to develop great computing solutions. In our usability lab, 15 full-time scientists constantly watch how people use our products. In fact, we've tracked over 1.5 million user actions to understand just how you work with your computer.

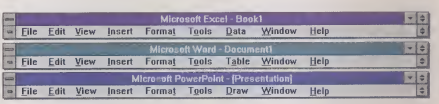


Click on any icon in the Microsoft Office Manager and it instantly moves you from one program to another.

That's why Microsoft consistently pioneers better ways to work. And the new Microsoft Office continues in the tradition that brought you toolbars, wizards, automatic functions, and a lot more. Now your 100 most common tasks can be done in one step.

Working as one.

One of the main things you told us was that you want programs which look and work alike. So we made it happen.



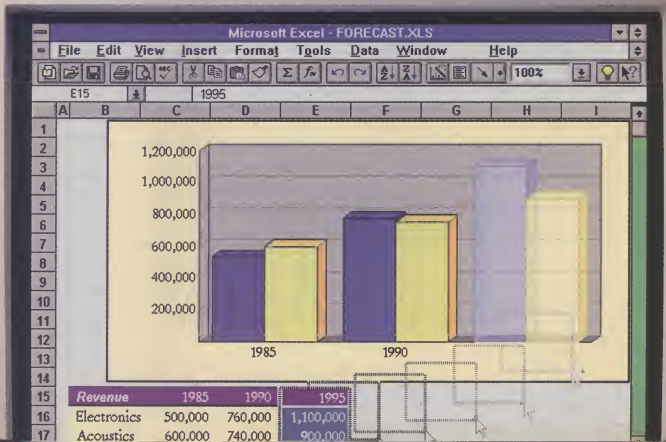
These menus from Microsoft Excel, Word and PowerPoint demonstrate a design consistency you'll also find in our toolbars, dialog boxes, and buttons.

For example, in the new versions of Microsoft Excel, Word and PowerPoint™, eight of the nine top level menu commands are the same.

And that's only the beginning. You can install the Microsoft Office in one integrated step and use the same shared tools like Microsoft Graph, WordArt and Spelling checker across all the programs. And the intuitive Microsoft Office Manager (MOM) makes it easy to use all these innovations together.

The Microsoft Office family of programs is the most popular office suite for the Windows and the Macintosh® operating sytems because it's built from the ground up by one company with one cohesive design philosophy. It all adds up to a whole new way to work.

ONLY THE MICROSOFT OFFICE HAS INTELLISENSE. BUILT-IN INTELLIGENCE THAT UNDERSTANDS WHAT YOU NEED AND HOW TO DO IT BEST.



With the Microsoft Office, IntelliSense™ technology has arrived. IntelliSense recognizes what you want to accomplish, adapts to the personal way you work, and delivers intelligent results. Now repetitive jobs are automatic, complex jobs are easier, and your computer is working much smarter.

SHip teh cartons friday.

Ship the cartons Friday.

The AutoCorrect feature in Word fixes typos as you make them. Automatically.

The basics are automatic.

Most everyday routines that you have to do, just to get to the real work, now happen automatically.

The exclusive AutoCorrect feature in new Word 6.0 instantly fixes typos as fast as you make them. That's one less thing to think about.

AutoFormat analyzes your document, instantly picks a format (or allows you to customize one) and makes your work look great.

In new Microsoft Excel 5.0, you can use the innovative AutoFilter to look quickly at different parts of your data, with the click of your mouse.

And the Drag and Plot feature lets you add a new row or column of data to your charts by simply dragging the information there. What used to take a number of steps now happens in one.

The TipWizard in Microsoft Excel tracks the way you work and offers bright ideas on how to save time.

Pictured at left, the Drag and Plot feature in Microsoft Excel enables you to update your chart instantly with new data. Just drag the new data and drop it into your chart.

Guiding. Informing. Thinking ahead.

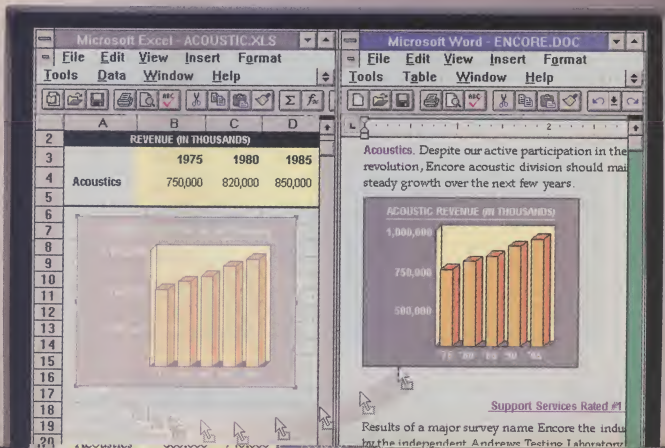
IntelliSense technology also means you have wizards and Cue Cards that inform you and guide you easily through more complex jobs like charting, designing presentations, customizing form letters, and creating data entry forms.

For instance, the TipWizard in Microsoft Excel observes how you work. Based on your individual patterns, it gives you tips on new ways to finish tasks with less effort. There's no easier way for you to discover how to reduce steps and save time. And avoid a trip to the manual.

The PivotTable Wizard guides you through building summary tables of your data. Now you can drag and drop your headings, then view and analyze your work from every angle.

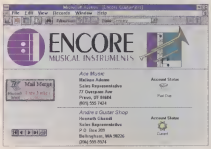
The powerful engineering in IntelliSense could only happen through our commitment to your ideas and to turning them into solutions you need. And only Microsoft can bring this much great thinking together all in one place.

ONLY MICROSOFT HAS OFFICELINKS. NOW IT'S SIMPLE TO SHARE DATA BETWEEN PROGRAMS WITHOUT LEAVING YOUR DOCUMENT.



New OfficeLinks makes it simple to share text, data, and graphics between programs, and lets you put them all together in the same document. You asked for innovation, and this delivers in a big way.

At the heart of OfficeLinks is



With OfficeLinks, it's effortless to mail merge your Microsoft Access data into a Word document. Lower right: Routing lets everyone in your workgroup share comments and information.

the latest Object Linking and Embedding technology (OLE 2.0). It's an open industry standard that helps everything in the Microsoft Office work together, even with software from other companies.

Drag and Drop between programs. Instantly.

Here's what moving information between documents is like: Drag a chart from Microsoft Excel and drop it into Word. Job done.

Hit the "Present It" toolbar button in Word, it'll automatically transfer your work to new PowerPoint 4.0 for an instant presentation.

Link data from Microsoft Access® with your Word document and you've got personalized letters for your entire customer base. Fast.

The end of jumping between applications.

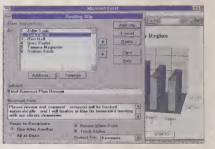
OfficeLinks lets you edit in place. In one place. Maybe you have a Microsoft Excel chart in the Word memo you're writing. And you need to change some figures. Click on the chart and instantly have all your spreadsheet tools to make the changes. Without ever leaving your Word document.

We call it Visual Editing. And once you've seen it in action, you'll understand just how integrated the Microsoft Office is. Moving, sharing and editing data between applications has changed forever.

Together in every way.

The Microsoft Office is bringing workgroups together, too. Your whole group can manage and edit documents as a team. Use the Routing feature to forward your draft, collect comments and merge the results.

Only the Microsoft Office lets you share files and macros between the PC and Macintosh. And through Visual Basic® for Applica-



Pictured at left, sharing data between programs is as easy as dragging it from one and dropping it into the other.

tions, the new Microsoft Office provides a powerful development platform for custom solutions.

GET THE NEW MICROSOFT OFFICE FOR $259. YOUR PC WILL NEVER BE THE SAME.

Until December 31, through a special offer for Microsoft customers, you can upgrade to Microsoft Office Standard edition, featuring Word 6.0, for $259. That's more than 30% off what you'd pay for these programs separately. If you're currently using competitive programs, get the Trade-up for only $299.

SPECIAL UPGRADE OFFER

MICROSOFT OFFICE STANDARD EDITION VERSION UPGRADE $259
If you are a licensed user of any program in the Microsoft Office family*

MICROSOFT OFFICE STANDARD EDITION TRADE-UP $299
If you have a competitive spreadsheet, word processor, presentation graphics or database program

If you act now, you'll automatically get Microsoft Excel 5.0 and PowerPoint 4.0 upgrades at no extra cost as soon as they're released.**

The Microsoft Office Standard edition includes Microsoft Excel, Word, PowerPoint and a Mail workstation license. For just $149 you can add the award-winning Microsoft Access database to your Office.

So it's a great time to get into this whole new way to work.

FOR THE NAME OF YOUR LOCAL RESELLER OR TO ORDER BY PHONE, CALL (800) 894-6642.

Microsoft Office

*To qualify for the version upgrade of Microsoft Office Standard edition, you must be a licensed user of at least one of the following members of the Microsoft Office family: Microsoft Excel, Word, PowerPoint presentation graphics program or Microsoft Access database management system. **Getting the Microsoft Office Standard edition version Upgrade or Trade-up entitles the user to Microsoft Excel 5.0 and PowerPoint 4.0 versions upon their release. Offer good only in the 50 United States. Offer expires December 31, 1993. Reseller prices may vary. In Canada: for information only, call (800) 563-9048. Outside the U.S. and Canada, call your local Microsoft subsidiary or (206)936-8661. © 1993 by Microsoft Corp. All rights reserved. Microsoft, Microsoft Access and PowerPoint are registered trademarks, and IntelliSense, Visual Basic, Windows and the Windows logo are trademarks of Microsoft Corp. Macintosh is a registered trademark of Apple Computer, Inc.

MICROSOFT WINDOWS

PC Computing

The Ultimate Windows Problem Solver!

Take complete control with our giant, hands-on illustrated guide

Windows Superguide

INSIDE

Solutions to 12 Problem Areas From Startup to Fonts to Networks

How to Identify Every Glitch And Zap It Instantly

Brian Livingston's Ten Top (Undocumented) Secrets

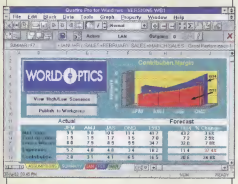
NEW!

THE EASIEST TO USE WINDOWS SPREADSHEET

Quattro Pro 5.0 delivers workgroup productivity today

Share information effortlessly

If you've ever wanted to share your spreadsheet information with other workers or automatically receive the most up-to-date information from someone else's spreadsheet, new Quattro® Pro 5.0 for Windows Workgroup Edition is for you. Quattro Pro's new Workgroup Desktop™ makes sharing information with coworkers as easy as passing a piece of paper, only a lot faster! Best of all, you can use your existing LAN, WAN, or electronic mail carrier without upgrading your LAN software or buying a separate workgroup product.* And with built-in support for SQL-based servers, you can view, query, and share more information than ever before.



Update everyone in your group at the touch of a button. Let the ***Workgroup Desktop*** *distribute your results automatically.*

The world's easiest Windows spreadsheet

Whether you're working alone on your spreadsheet or sharing data with a workgroup, only Quattro Pro puts everything you want under one roof. Complete on-line help and interactive tutors make Quattro Pro for Windows easy to learn. And Spreadsheet Notebooks make it easy to use. There are even built-in Experts™ that do tasks—like building graphs and managing scenarios—for you, *automatically!* Plus there's more analytical power here than in Excel, 1-2-3, and Improv combined. And the graphics . . . you have to see them to believe them! Get the new Quattro Pro 5.0 for Windows Workgroup Edition today.

New Workgroup Edition

Limited-time Offer!

$99.95† *Upgrade price for Lotus 1-2-3 and Excel users*

$495 *Suggested retail price for new users*

90-day, Money-back Guarantee

See your dealer today or call 1-800-336-6464, ext. 6165

In Canada, call 1-800-461-3327.

Borland

Power made easy

Circle 167 on reader service card.

Copyright © 1993 Borland International, Inc. Quattro Pro for Windows and Spreadsheet Notebooks have patents pending. Offer good in the United States and Canada only. All prices in U.S. dollars. Dealer prices may vary. *Supported communication transports, Novell Message Handling Service (MHS and NGM), MCI Mail; cc:Mail (vendor-independent messaging): Windows for Workgroups, MS-Mail, and other MAPI-compliant messaging services; Local Area Network (LAN) systems, such as Novell NetWare, Banyan, IBM LAN Server, MS-LAN Manager, AT&T StarGROUP; and other peer-to-peer networks. †$79.95 Upgrade offer for existing Quattro Pro users with $20 rebate coupon enclosed in Special Upgrade box. BI 5451

Take Charge Of Windows

Is Windows throwing tantrums at you? Our 48-page hands-on Superguide includes new tips and tricks in 12 key areas that will keep your system running at peak efficiency.

Windows 3.1 users, welcome to the terrible twos. Your favorite operating system will soon celebrate its second birthday. So you shouldn't be surprised when it behaves like a kicking, screaming bundle of wonder and thunder.

You might as well accept the facts of life. Windows 3.1 is sooner or later going to fuss, fight, or pitch a fit. Tired of playing with you? Windows throws up a general protection fault and takes a nap. Wants to talk to you? Its vocabulary is riddled with baffling nonsense error messages. And when things don't go just its way, Windows throws a tantrum.

What's a parent to do? Like other two-year-olds, Windows thrives under a firm but gentle hand. Which is why *PC/Computing* offers this second annual Windows Superguide. It's our all-inclusive collection of essential information and hands-on tips to keep your Windows system running with as few temperamental outbursts as possible.

We start with this premise: The only way to take control of Windows is to understand it thoroughly. What happens when you set up and start up Windows? How does it step through the mine fields of memory management, high-resolution video, and printing? What are the secrets of high-speed communications over a modem or across a network? How do you manage fonts and integrate applications with object linking and embedding and multimedia? And can DOS and OS/2 really coexist peacefully with Windows?

What's the best way to set up a swap file? We show you how on page 191.

PC/Computing's top Windows experts spent months poring over unpublished Microsoft documents, scouring online services, cross-referencing thousands of pages of official documentation, and exchanging hard-earned secrets. We asked Microsoft's Product Support Services for its exclusive list of the most frequently asked questions in each of these core areas. Then we added tips (many of them undocumented) and troubleshooting information from our own files.

The result? This collection of insider's information and advice. We think you'll find it invaluable.

—*Ed Bott*

In The Dog-Eat-Dog We Offer You More Ways

Desktop Systems That Will Make Your Rivals

486 POWER AND SX AFFORDABILITY: OUR 486SX/33 SYSTEM

- Intel486™SX/33 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- Super I/O Board
- VGA Video Card
- 210 MB Hard Drive
- Modem
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

We feature Intel inside every computer shown.

$999
(MONITOR SOLD SEPARATELY)

50 MHz PERFORMANCE AT A GREAT PRICE: THE 486DX2/50

- Intel486™DX2/50 CPU
- 4 MB RAM
- Dual 1.44 MB 3 1/2"/ 1.2 MB 5 1/4" Floppy Drive
- 340 MB Hard Drive
- 1 MB Super Local Bus Video Card
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1
- AmiPro/Lotus 1-2-3
- Keyboard and Mouse

$1,699
$63/MO* (MONITOR SOLD SEPARATELY)

AFFORDABLE MULTI-MEDIA TECHNOLOGY: THE MULTIMEDIA MACHINE

- Intel486™SX/33 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- 245 MB Hard Drive
- Dynamic Microphone
- PCTV Card with Capture
- Multimedia Card
- CD-ROM Drive
- 2400 bps Data Modem with 96/96 Send/Receive FAX
- 1 MB SVGA Video Card
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

$1,999
$74/MO* (MONITOR SOLD SEPARATELY)

IT'S LOADED! COMPUDYNE'S 66MHz INCREDIBLE OFFICE MACHINE

- Intel486™DX2/66 CPU
- 4 MB RAM
- 1.44 MB 3 1/2" Floppy Drive
- 340 MB Hard Drive
- 250 MB Tape Backup System
- 1 MB Super Local Bus Video Card
- CD-ROM Drive
- 2400 bps Data Modem with 96/96 Send/Receive FAX
- Compudyne I/O VESA Local Bus Motherboard
- Compudyne 15" .28 NI Monitor
- MS-DOS 6/Windows 3.1
- Keyboard and Mouse

$2,999
$111/MO* (MONITOR INCLUDED)

UPGRADABILITY

Our VESA Local Bus board and low-insertion force socket let you upgrade all the way to Intel's Pentium™ Overdrive™ processor.

RELIABILITY

Our desktop systems are assembled and tested at your local CompUSA by a team of technicians dedicated exclusively to local customer support.

CONFIGURABILITY

If one of these bundled solutions doesn't fit the bill, custom configure one from our stock of over 5,000 products.

RETURNABILITY

All systems come with a 30-day, no questions asked return policy.** It makes buying a computer care free.

SUPPORT *Toll-free technical support. On-site service for desktops available at additional charge[1]. Training classes available.*
WARRANTIES *30-day, no questions asked, return policy.** 1 year limited warranty. Extended warranty available.*
HOURS *24 hours a day, 7 days a week.*

GOVERNMENT/EDUCATIONAL SALES CALL:
800·862·3088
FAX: 214-888-5783 · COMPUSA GSA#: GS00K93AGS-6319

World Of Business, To Chew Up The Competition.

Run Home With Their Tails Between Their Legs.

THE ULTIMATE 66MHz WORKSTATION, AT THE SMALLEST PRICE AROUND.

- Intel486™DX 2/66 CPU
- 8 MB RAM (1 MB x 8)
- 1.44 MB/3 1/2" Floppy Drive
- 420 MB Hard Drive
- 250 MB Tape Backup System
- 1 MB Super Local Bus Video Card
- Compudyne I/O VESA Local Bus Motherboard
- CMPD 15" SVGA Monitor
- MS-DOS 6/ Windows 3.1
- AmiPro/Lotus 1-2-3
- Keyboard and Mouse

PENTIUM OVERDRIVE UPGRADE AVAILABLE

$2,799
$103/MO* (MONITOR INCLUDED)

TOWER OF POWER: THE AFFORDABLE 66MHz SERVER SOLUTION

- Intel486™DX 2/66 CPU
- 16 MB RAM (4MB x 4)
- 1.44 MB 3 1/2" Floppy Drive
- 1.2 MB 5 1/4" Floppy Drive
- 1.3 GB Hard Drive
- 800 x 600 Video Card
- Backup Power Supply
- Compudyne I/O VESA Local Bus Motherboard
- MS-DOS 6/Windows 3.1

PENTIUM OVERDRIVE UPGRADE AVAILABLE

MICROSOFT WINDOWS 3.1 READY-TO-RUN

Every computer shown is Microsoft™ Windows™ Ready-to-Run

- Keyboard and Mouse

$3,499
$129/MO* (MONITOR SOLD SEPARATELY)

SERVICEABILITY

We offer knowledgeable salespeople, on-site and in-store technical support, training classes, and toll-free phone support.

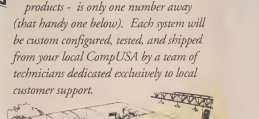
ACCESSIBILITY

• Atlanta • Baltimore • Boston • Charlotte • Chicago • Cleveland • Cincinnati • Dallas • Denver • Detroit • Greensboro • Houston • Kansas City • Las Vegas • Los Angeles • Miami • Milwaukee • New Orleans • New York City • Norfolk • Philadelphia • Phoenix • Pittsburgh • Providence • Rochester • Sacramento • San Diego • San Francisco • St. Louis • Tampa • Washington, D.C.

*Leasing arranged through Leasing Group, Inc., payments based on 36-month open-end rate. **Must be returned "as new" in original packaging. †Within the continental United States. Each system will be shipped from the nearest CompUSA Superstore®. CompUSA is not responsible for typographic/technical errors. Other limitations apply. Training courses not offered as vocational training or as qualifying one for any particular employment. Course credits not transferable to any accredited educational institution. In Texas, Nevada and Connecticut, classes are offered as employer sponsored courses, not open to general public. Prices and specifications subject to change without notice. Intel 486 and the Intel Inside logo are trademarks of the Intel Corp. TM/® Trademarks belong to their registered owners. CompUSA Direct, 15167 Business Avenue, Dallas, TX 75244.

COMPUDYNE FROM COMPUSA: $1.3 BILLION STRONG AND GROWING

The muscle behind Compudyne is none other than CompUSA®, the Computer Superstore™, a publicly traded, $1.3 billion company with 50 locations across the United States. For the direct customer, this means that the full inventory of an entire superstore - over 5,000 products - is only one number away (that handy one below). Each system will be custom configured, tested, and shipped from your local CompUSA by a team of technicians dedicated exclusively to local customer support.



Compudyne and CompUSA team up to give you personal service, quick delivery, and the widest selection of name-brand items in the business, all at super low prices, everyday.

COMPUDYNE
800-COMP USA

COMPUSA
THE COMPUTER SUPERSTORE

24 HR FAX: 800-FAX-2212
INTERNATIONAL: 214-888-5770
INTERNATIONAL ORDERS WELCOME
ON OUR 24 HR FAX LINE: 214-888-5706

PCC1131

Circle 195 on reader service card.

Windows Superguide

Take Charge of Windows 179

Make the most of Windows—try our expert tips for installing, customizing, and troubleshooting. It's all in our second annual Superguide—the essential 48-page, one-stop source for taming Windows.

PART ONE

STARTUP 184

What to do when Windows won't load? Startup switches and Bootlog can get you back online.

SETUP 190

Installing new hardware? Let Setup do the dirty work. Our list of commands gets Setup to run even when it doesn't want to.

Optimize your virtual-memory settings.

MEMORY 194

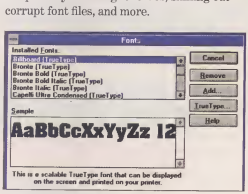
Windows insist you're out of memory? Reclaim RAM for your Windows apps.

PRINTING 200

Print jobs vanishing into the ether? Resolve print problems using the Control Panel's Printer utility and Print Manager.

FONTS 206

Drowning in fonts? Follow our steps for temporarily disabling font files, sniffing out corrupt font files, and more.



Check for corrupt font files–quickly.

INTEGRATION 215

Get the lowdown on OLE 1.0 vs. 2.0, using OLE with DOS apps, and customizing links.

VIDEO 222

No picture? Distorted images? Suspect your video-card driver and resolve problems quickly.

COMMUNICATIONS 228

Losing data during high-speed transfers? Check our tips for hassle-free, high-speed communications under Windows.

NETWORKING 236

Don't be at the mercy of your network—master it with our quick solutions.

Cut through network snags.

MULTIMEDIA 250

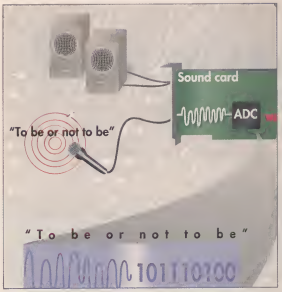
CD-ROM drive won't spin your favorite discs? Don't despair. We offer solutions to the most vexing multimedia questions.

DOS APPS 259

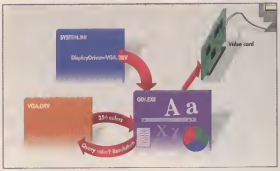
The best way to run DOS programs? Under Windows, of course. Follow our advice for the best way to create PIFs for your DOS apps.

WIN-OS/2 270

When Windows apps won't run under OS/2, suspect a flaky video driver. We show you how to check for one.



The lowdown on sound. See page 252.



How a video driver works. See page 223.

OLE 2.0's smarter objects. See page 216.

PART TWO

When All Else Fails.....280

Part Two covers common Windows maladies plus Windows expert Brian Livingston's favorite undocumented features.

UNINSTALLING WINDOWS APPS 280

Some things you shouldn't do yourself—like uninstalling Windows apps. Uninstaller 2.0 is the utility that Windows forgot.

SOFTWARE INCOMPATIBILITIES 282

Plagued by odd software errors? Check this list of known incompatibilities for quick solutions and workarounds.

GENERAL PROTECTION FAULTS 283

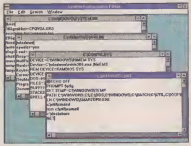
GPFs are Windows demons. Find out where they occur and how to banish them from your system for good.

ERROR MESSAGES 288

Ever get the feeling you and Windows aren't speaking the same language? We decode the most common error messages for you.

TEN COOL TRICKS 293

The coolest software tips and tricks are *never* in the manual. Windows guru Brian Livingston reveals his ten favorite secrets.



Tap into undocumented features.

Windows Refuses to Load? Try This Bag of Tricks

Startup switches and Bootlog get you up and running. BY MATTHEW LAKE

Quick, what's the ugliest thing you can imagine? The DOS prompt? If you're like most Windows users, it's probably pretty high on the list. Fortunately, banishing DOS's homely C: prompt is as simple as typing W-I-N.

What goes on behind the scenes is a lot more complicated than these three letters seem to imply. Each time that you type WIN, you load a program called WIN.COM. It's WIN.COM's job to scout out your system's available resources and then set off a chain reaction that loads Windows' many files. (See "What Happens When You Type WIN" on page 185 for more details on WIN.COM's function.) To understand what makes Windows run (or refuse to run, as the case may be), you need to grasp three parts of its architecture: the core files, the drivers, and the shell.

HIGHLIGHTS

- Find errors with Bootlog.
- Speed load time.
- Suppress the 3.1 logo.
- Load apps at startup.
- Recover program groups.

THE CORE FILES

Windows has three core files, the kernel (KRNL386.EXE), the graphics device interface (GDI.EXE), and the user file (USER.EXE), all of which reside in the Windows System subdirectory. If any of these files isn't working properly or can't find the information it needs, Windows refuses to load. The core files load in the following sequence:

The kernel file. The kernel file handles all the cogs and gears of managing Windows—it executes Windows applications and manages their memory. Which kernel file loads depends on the mode that you run Windows in—it's KRNL286.EXE for Standard mode and KRNL386.EXE for 386 Enhanced mode.

The graphics device interface. The next layer up from the kernel is the GDI. It takes care of the operations that create graphics on the monitor and printer and interacts with your system's video driver. It also takes inventory of your system fonts.

The user file. The third core file to load is called USER.EXE. Its job is to create and maintain windows onscreen, as well as process keyboard and mouse commands to move, resize, or close windows.

THE DRIVERS

Because of the wide variety of hardware that goes by the description of *PC compatible,* the core files can't work without the help of *drivers,* software routines that tell your system how to address specific hardware—be it your video card, keyboard, or mouse. As Windows loads, it refers to listings of installed drivers found in the two Windows configuration files, SYSTEM.INI and WIN.INI, and then loads them into memory.

Once the kernel file of Windows loads and USER.EXE activates, the drivers are initialized. At this point during startup, the Windows logo vanishes and the desktop and the hourglass cursor appear.

SUPER TIP Load an application while you're loading Windows by typing WIN followed by the name of the program's executable file. To have Windows fire up Excel at startup, for example, just type WIN EXCEL at the command line—Excel pops up as soon as Windows comes to life. (If the Windows application isn't mentioned in your AUTOEXEC.BAT file's PATH statement, you'll have to specify the drive and path for the program as well.)

THE SHELL

The last elements to load at Windows startup are two programs mentioned in the [Boot] section of SYSTEM.INI. The first is the Windows shell, the second the task manager. The shell provides a forum for you to install and load Windows applications, and the task manager is the utility that lets you switch between already running applications.

Most people use Program Manager as their shell, but File Manager is another native Windows option. Norton Desktop, PC Tools for Windows, and Dashboard are worthy third-party replacements. Commercial replacements make the necessary changes to SYSTEM.INI to make themselves the designated shell.

Q STARTUP OPTIONS

What switches can I use at startup to troubleshoot Windows?

A: WIN.COM starts Windows by first determining what kind of resources are at its disposal and then deciding whether to start

Windows in 386 Enhanced mode or in Standard mode. If it finds at least 1,024K of available extended memory and has access to a 386 processor, it loads Windows in Enhanced mode; otherwise, it defaults to Standard. (If the machine has less than 256K of free conventional memory and 192K of free extended memory, WIN.COM refuses to start Windows at all.)

Assuming that your PC meets the minimum requirements for loading Windows, here's a list of useful WIN.COM switches to troubleshoot the startup process:

WIN /? Lists Windows' startup switches.

WIN /3 Starts Windows in 386 Enhanced mode.

WIN /S Starts Windows in Standard mode.

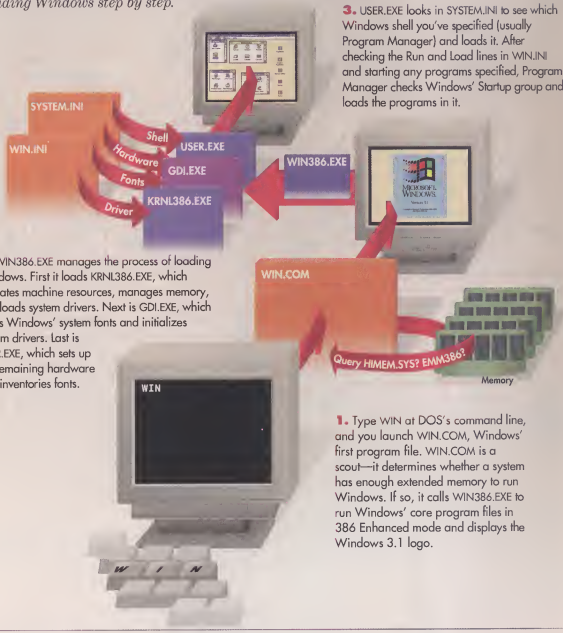
WIN /B Lists files that Windows loads (or that it fails to load) at startup and then records them in a file called BOOTLOG.TXT in the Windows directory.

WIN /D:F Turns off 32-bit disk access. (This switch is equivalent to SYSTEM.INI's [386Enh] setting 32BitDiskAccess=False .)

WIN /D:S Specifies that Windows should not use ROM address space between F000:0000 and 1MB for a break point. (This switch is equivalent to SYSTEM.INI's

WHAT HAPPENS WHEN YOU TYPE WIN

Loading Windows step by step.



1. Type WIN at DOS's command line, and you launch WIN.COM, Windows' first program file. WIN.COM is a scout—it determines whether a system has enough extended memory to run Windows. If so, it calls WIN386.EXE to run Windows' core program files in 386 Enhanced mode and displays the Windows 3.1 logo.

2. WIN386.EXE manages the process of loading Windows. First it loads KRNL386.EXE, which allocates machine resources, manages memory, and loads system drivers. Next is GDI.EXE, which loads Windows' system fonts and initializes system drivers. Last is USER.EXE, which sets up the remaining hardware and inventories fonts.

3. USER.EXE looks in SYSTEM.INI to see which Windows shell you've specified (usually Program Manager) and loads it. After checking the Run and Load lines in WIN.INI and starting any programs specified, Program Manager checks Windows' Startup group and loads the programs in it.

[386Enh] setting SystemROMBreakPoint=False.)

WIN /D:V Specifies that the ROM routine handles interrupts from the hard drive controller instead of using Windows internal code. (This switch is equivalent to SYSTEM.INI's [386Enh] setting VirtualHDIRQ=False.)

WIN /D:X Excludes all of the adapter area from the range of memory Windows scans to find unused space. (This switch is equivalent to SYSTEM.INI's [386Enh] setting EMMExclude=A000-FFFF)

Q STARTUP FAILS

Windows hangs mysteriously after displaying its opening screen. What's the holdup?

A: Narrow down startup problems with Windows' Bootlog feature. To use Bootlog, load Windows by typing WIN /B at the DOS command line. When Windows finishes loading (or fails to load), open the ASCII text file called BOOTLOG.TXT in the Windows directory using any text editor. It should contain lines like the following ones:

```
LoadStart=OEMFONTS.FON
LoadSuccess=OEMFONTS.FON
Init=Mouse
Status=Mouse Driver Installed
InitDone=Mouse
```

If one of the lines includes the phrase InitFail or LoadFailure, you've found the culprit. To fix the problem, reinstall the file that failed to load by copying it from your original Windows floppies. Use the Expand program from your Windows directory in order to extract the original file from the distribution disks.

How? Suppose the file OEMFONTS.FON fails to load. Search your Windows disks for the file called OEMFONTS.FO_ (in its compressed form). Change to the Windows System subdirectory, and at the DOS prompt type EXPAND A:OEMFONTS.FO_C:OEMFONTS.FON.

Q SLOW LOADING

I run Windows from a network. The connection is fast, but it takes nearly a minute for Windows to load. Why?

A: The most likely cause of this problem is that you're creating temporary swap files across a network drive. This not only makes loading slow but also affects the speed at which Windows runs when it has to read and write data in swap files.

When you load Windows in 386 Enhanced mode, the temporary swap file is created by default in the startup location of WIN.COM. In 386 Enhanced mode, Windows creates a temporary swap file from roughly half of the available contiguous free disk space. On a network drive, this swap file can become enormous, slowing Windows to a crawl as it searches across acres of hard disk space for the files it needs.

A better idea? Set up a permanent local swap file for improved performance. From Windows' Control Panel, double-click on the 386 Enhanced icon, click on the Virtual Memory button, and then click on Change. Now select a local drive (not a compressed drive—Windows won't allow it); Windows recommends the optimal swap file size for your system.

SUPER TIP

During startup, Windows takes inventory of every font listed in its INI files—which means you'll go gray waiting for Windows to load if you have a huge collection of fonts installed. Since nobody uses 100 fonts in one Windows session (at least we hope not), remove fonts you don't use often. To do this, go into Windows' Control Panel under the Fonts icon, select fonts you don't use, and click on the Remove button. If the Remove Fonts from Disk option isn't selected, you can reinstate them later by clicking on Add.

Q CORRUPT GROUPS

When loading Windows, I get a message saying my Program Manager groups are corrupted. How do I correct this?

A: Your hard drive may be getting full (whose isn't?), or the Program group files (they're in the Windows directory with a .GRP extension) may have become corrupted. Check your hard disk capacity and do some housekeeping if necessary. If that doesn't do the trick and the Program group files are damaged, you can quickly recreate them using Program Manager's file menu. You can recreate Windows' native program groups (Main, Startup, Accessories, and so on) by running Windows' Setup utility with the /P switch—type SETUP /P from DOS.

Q EMM386 ERROR

Why do I get the message "Unable to start Enhanced mode Windows due to invalid path specification for EMM386" when I load Windows?

A: This error occurs when you run Windows in 386 Enhanced mode off a Novell or DEC Pathworks network. It's easy to correct with a little editing of CONFIG.SYS and SYSTEM.INI. The CONFIG.SYS file's EMM386.EXE line should use the /Y parameter to specify the path to EMM386.EXE, and it should include the =W parameter for the Switches line. Open CONFIG.SYS with a text editor and adjust the appropriate lines to read:

```
Device=EMM386.EXE /Y=D:\EMM386.EXE Noems
Switches=/W
```

You also need to specify the location of the network server that holds the file WINA20.386 in the [386Enh] section of the SYSTEM.INI file to read:

```
Device=D:\WINA20.386
```

(If necessary, you may change the setting for both the drive and the path from D:.)

TO WIN THE PAPER CHASE

Print

Fax

Scan

Cut and Paste

Copy

STOP CHASING PAPER

DOC·IT INCREASES YOUR PRODUCTIVITY AT WORK.

We've just brought the paper chase to a resounding and refreshing halt with the invention of DOC·IT, the revolutionary desktop document processor that combines a multitude of talents.

With DOC·IT, Okidata has integrated faxing, printing, copying, scanning, cutting and pasting in one unit with a footprint so compact, it takes up just a corner of your desk. Incorporating graphics capability compatible with Windows™ and most major software, DOC·IT lets you create and communicate finished presentation-quality documents–complete with visuals–without having to get out of your chair.

No more standing in line. Everything sits on the corner of your desk: simple, handy, productive and private; and incredibly easy to use. If DOC·IT looks good to you on paper, come see it in action at your nearby authorized Okidata DOC·IT dealer. ***TO RECEIVE YOUR OWN ON-SCREEN DEMO DISK, OR THE NAME OF A DEALER NEAR YOU, CALL 1-800-OKI-TEAM, EXT. 265.***

Circle 182 on reader service card.

THE SMARTEST CORNER OF YOUR DESK.

DOC·IT™ BY OKIDATA®

A Division of Oki America, Inc.

DOC·IT T.M. Okidata Reg. T.M. M.O. OKI Electric Industry Company, Ltd. Windows T.M. Microsoft Corp. "THE END OF THE PAPER CHASE" Reg. T.M. Micro Dynamics, Ltd., Silver Spring, MD.

Superior In E

Every Nanao monitor undergoes intense scrutiny and testing to ensure maximum performance and product reliability. Our quality control processes and technical standards are among the most rigorous in the industry.

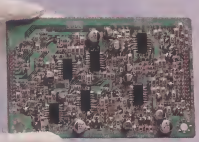
Our new line of Ecological Design™ Monitors incorporates advanced energy-saving features including PowerManager, which cuts power as much as 93% when the monitor is not in use. (After Dark screen saver software free with each monitor.)

Nanao was the first monitor company to join in partnership with the EPA Energy Star Program. Our commitment to bring technical innovation to today's environment ranges from eliminating CFCs in our manufacturing process to using recyclable packaging and paper products.

Nanao FLEXSCAN technology is compatible with all of today's popular graphics cards, offering a viewing environment ranging from enlarged graphics to multimedia.

Nanao's FLEXSCAN family of monitors meets safety specifications for radiation emissions established by the Swedish MPR-II guidelines as well as those of TCO, the Swedish Confederation of Professional Employees. Nanao was the first monitor manufacturer to achieve FCC Class B approval for our 80kHz frequency monitors.

High quality PCB boards are assembled, adjusted and inspected at Nanao's special chip-mounting factory. All PCB boards are built using sophisticated surface-mount technology.



Model	Size	Dot Pitch	Scan Frequency	Recommended Resolution
T660i	20"	0.36mm	H:30-82kHz V:55-90Hz	1280x1024
T560i	17"	0.25mm	H:30-82kHz V:55-90Hz	1280x1024
F760i/W	21"	0.31mm	H:30-78kHz V:55-90Hz	1280x1024
F563i/W	17"	0.26mm	H:30-82kHz V:55-90Hz	1280x1024
F532i/W	17"	0.28mm	H:27-67kHz V:55-90Hz	1024x768
F540i/W	15"	0.28mm	H:27-61.5kHz V:55-90Hz	1024x768

Nanao T-Series and F-Series monitors have captured every major award.

very Detail.

A heritage of precision craftsmanship and attention to detail has been designed into Nanao's family of display monitors.

Our high resolution CRTs deliver a complete range of color displays with photographic quality and brilliant color images to sophisticated applications like CAD, DTP and multimedia. TRINITRON® CRT models offer greater precision and intricate detail, while Nanao's Invar Shadow Mask Flat Screen CRT models provide a wide display area and lower distortion image. Both CRTs feature our unique built-in Dynamic Beam Spot Control System that ensures maximum brightness and sharp focus.

To reduce glare, eliminate static electricity, and improve the focus level on the display area, Nanao has developed two anti-reflective innovations: ErgoCoat,™ a protective coating for all F-series monitors, and ErgoPanel,™ a sturdy panel that covers the surface of our T-series monitors.

Our user-friendly front control panel incorporates ergonomic design and ease-of-use as well as a variety of powerful options for customizing images.

At Nanao, details make all the difference in creating our family of professional display monitors. From the product design and manufacturing that takes place in our factory to the end user's working environment, Nanao pays attention to every detail. In engineering. Assembly. Product testing. Quality control. Shipping. Customer support. From the very first days of the company, we set out to be an innovator in monitor technology. And, in a few short years, we have achieved that goal. Today, Nanao has the lowest repair rate in the monitor industry, the highest product reliability, and a fast-growing number of enthusiastic customers. So if you're looking for a superior monitor, start with the details. We do.

NANAO®

NANAO USA CORPORATION
23535 Telo Avenue, Torrance, CA 90505
(310) 325-5202 Fax: (310) 530-1679

1-800-800-5202

Superior in every detail is a registered trademark of Nanao Corporation. All product names are trademarks of their respective companies. © 1993 Nanao USA Corporation. The Energy Star emblem does not represent EPA endorsement of any product or service.

Circle 212 on reader service card.

Installing New Hardware? Let Setup Do It for You

Configure your mouse, video card, program groups, and more. BY FRED DAVIS

It's like a bizarre tribal ritual: You tell Windows you want to install a new printer, so it tells you to insert disk 4 and hit the Enter key a few times. The only things missing are the costumes and chants. For all the peculiar antics Windows Setup requires, however, it does two things well: It installs Windows, and it lets you select the device drivers your system uses.

HIGHLIGHTS

- Customize installation.
- Optimize swap files.
- Bypass Setup errors.
- Control Setup switches.
- Update drivers.

Windows Setup runs in two different modes, DOS and Windows. The first time you run Setup—to install Windows itself—it runs in DOS mode. Halfway through the installation procedure, it switches gears to Windows mode and completes the configuration process. After installation, Setup can be run in either DOS mode or Windows mode. In Windows mode (click on the Windows Setup icon to run it under Windows), you can change the drivers for your display, mouse, keyboard, and network. To change any other system drivers, you must run Setup in DOS mode (type SETUP from the Windows directory).

WHEREFORE THE HARDWARE?

When you run Setup from DOS to install Windows, it follows a script in the text file SETUP.INF that walks it through a carefully choreographed routine. During installation, Setup takes the following steps:

1. Determines what hardware is in your system and how it's configured.
2. Decides which device drivers are necessary for running Windows and installs them.
3. Decompresses and copies the device drivers and Windows system files onto your hard drive.
4. Creates or customizes Windows' two initialization files, SYSTEM.INI and WIN.INI.
5. Tweaks the two DOS startup files, CONFIG.SYS and AUTOEXEC.BAT.
6. Generates your initial Program Manager groups (Main, Startup, Accessories, and Games) and Program Manager icons.

Setup copies any device driver files it needs from either the original Windows installation disks or third-party driver disks into your System subdirectory (which must be located in your main Windows directory). Drivers it installs are recorded in the SYSTEM.INI file. You can also run Setup after installation in order to create program icons and remove or add components to your Windows environment, such as accessories and wallpaper patterns. As a rule, changes you make during Windows Setup don't take effect until you restart Windows.

CUSTOM OR EXPRESS

During installation, Windows 3.1 boasts an Express Setup feature that can painlessly set up your system in a minimum amount of time. For control freaks, there's also a Custom Setup option, which lets you decide exactly what components are installed on your system.

In Express mode, the Setup program guesses at the hardware and software configuration in your system. Then it takes a quick peek to see whether you have enough hard disk space for installation (or suggests ways to trim the size of Windows if there's not enough room) before it finally installs it.

The other option—Custom Setup—lets you monitor and control the setup process, allowing you to do the following:

- Select the details of your hardware configuration, such as the attached monitor, mouse, keyboard, and printer.
- Select which Windows components are loaded onto your hard drive (for keeping your disk lean and mean).
- Monitor changes to your CONFIG.SYS and AUTOEXEC.BAT files—

SUPER TIP Control Setup by starting it with any combination of the following switches:

SETUP /B Installs Windows for a system with a monochrome display.

SETUP /C Prevents Setup from searching for TSRs before installation.

SETUP /I Overrides Setup's automatic detection of your hardware configuration.

SETUP /T Tells Setup to search the drive for software that may be incompatible with either Setup or Windows.

SETUP /P Rebuilds the original Program Manager groups (Main, Startup, Accessories, and Games).

this is always a good idea if the files contain any special settings.

• Automatically generate program icons for applications already on your system.

• Adjust your virtual-memory settings for running Windows in 386 Enhanced Mode.

If you use this last option and specify a permanent swap file, you can enable a feature called FastDisk, which allows Windows to directly control many hard disk controllers. This is the most effective thing you can do to improve system performance.

For more information on temporary and permanent swap files, see "How Swap Files Work," below.

SETUP FAILS

Q While trying to run Setup, it starts to load, then hangs. How can I get around this problem?

A: You can prevent the most common Windows Setup hiccups by making sure that all of your hardware options and configurations are set correctly—before you start your installation.

If Setup still fails, disable its hardware examination feature using the /I switch. Setup normally probes your system in order to determine what hardware you have—a process that can sometimes crash the device being probed. When you start Setup by typing SETUP /I, Windows uses its default hardware device drivers. Even if these drivers don't match the devices that are in your system, they'll get you up and running.

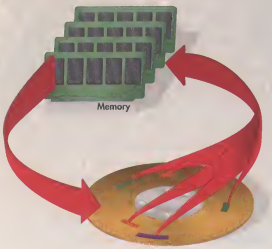
Once you have Windows installed, you can rerun Setup without incident and then select the proper drivers for the hardware in your system.

SUPER TIP If Setup is relying on advanced features that your particular hardware gizmo doesn't support, try using the generic Windows' driver for the device, such as the Microsoft VGA video driver. This will at least get you up and running until you can get your hands on the proper driver from the manufacturer.

HOW SWAP FILES WORK

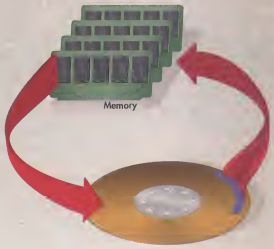
Permanent files have the edge.

A swap file is part of a hard disk that Windows uses to temporarily stash data when it runs out of RAM for applications it's running. It uses the swap file to juggle information between RAM and the hard disk.
There are two types of swap files: permanent and temporary. You create and delete both from Windows' Control Panel by choosing the 386 Enhanced icon and selecting the Virtual Memory button. While permanent files are faster than temporary ones, all swap files slow performance when they're in use.



TEMPORARY SWAP FILE

A temporary swap file is made up of many data sectors spread randomly across a hard drive. Windows has to move around the hard disk each time it accesses a temporary swap file, which slows its performance appreciably. Windows creates a temporary swap file named WIN386.SWP on the fly; it's automatically deleted when you quit Windows.



PERMANENT SWAP FILE

A permanent swap file uses a contiguous area of the hard disk that is reserved for its use. Permanent swap files are faster than temporary swap files because with permanent ones, Windows always knows the exact location of the information it's looking for. Unlike temporary swap files, permanent files are not deleted when you quit Windows.

Q MISSING DRIVER

Windows doesn't include a driver for a hardware device in my system. Where can I get the proper driver?

A: Microsoft issues periodic updates of its Windows Driver Library—an ongoing collection of Windows device drivers that didn't make it onto the standard set of Windows 3.1 installation disks. The Windows Driver Library is available, at no charge, online from Microsoft (dial 206-936-6735 via modem and download the file WDL.TXT) and from CompuServe. Microsoft will also mail you the Windows Driver Library on disk; call Microsoft at (800) 426-9400 to obtain more information. Your other option is to contact the hardware manufacturer directly for the device driver that you need.

Q ERROR LOADING

Running Setup, I get an error message that begins "Error loading," and then Setup fails. Why?

A: This problem is usually caused by a bad or missing driver setting in the [Boot] section of your SYSTEM.INI file. If Setup is installing Windows 3.1 on top of a previous version of Windows, it attempts to load all the drivers ending with the extension .DRV located in the [Boot] section of the SYSTEM.INI file. One of these three settings usually triggers the problem: SYSTEM.DRV, DISPLAY.DRV, or SHELL. Edit settings in SYSTEM.INI using a standard text editor such as the one included in DOS 5.0 and later versions, or use Sysedit.

SYSTEM.DRV. The default setting is:

```
SYSTEM.DRV=SYSTEM.DRV
```

When you get a straight "Error loading" message, it means that in all likelihood the SYSTEM.DRV setting is blank. To fix the problem, change the SYSTEM.DRV line to the default setting.

An "Error loading *driver*" message means that Setup can't load a third-party driver for some hardware device in your system. Get around the problem by setting SYSTEM.DRV to the default setting, then restoring the old setting once Windows is successfully installed.

An "Error loading SYSTEM.DRV" message means that one or both of the files KRNL386.EXE and KRNL286.EXE are located in the Windows directory instead of in the Windows System subdirectory where they belong. If you see this error message while you're still installing Windows 3.1, delete these two files from the Windows directory and reinstall Windows. If Windows 3.1 is already installed on your system, copy these files to the Windows System subdirectory, making sure they're dated 3/10/92 or later. If they're not, delete them and reinstall Windows.

SUPER TIP The easiest way to recover a damaged SETUP.INF file (located in the Windows System subdirectory) is to rename the damaged version and copy a new one from your original Windows 3.1 installation disk 1 using DOS's COPY command.

DISPLAY.DRV. The default setting is:

```
DISPLAY.DRV=VGA.DRV
```

An "Error loading *display driver*" message can mean that you've selected the wrong video driver while running Setup. Run Setup again and switch to a video driver that your video card supports, or select a simpler display resolution for Setup. If you still have problems, contact your video-card vendor for updated drivers.

SHELL. The default setting is:

```
SHELL=PROGMAN.EXE
```

An "Error loading PROGMAN.EXE" message means that the Shell setting is either incorrect (there's an old version of the file SHELL.DLL in the Windows System subdirectory) or blank. The solutions are straightforward: Set the Shell setting to its default; make sure the SHELL.DLL file is the latest version (the Windows 3.1 SHELL.DLL is dated 3/10/92 or later and is 41,600 bytes).

SUPER TIP Setup provides a mode for creating custom installations automatically with a special setup template file called SETUP.SHH to complement the SETUP.INF file. Open this file (located on disk 1 of your original Windows floppies) with any text editor to discover how it works.

Q TSR ERRORS

Windows hangs during Setup and gives me warnings about TSRs. What can I do?

A: One common reason Setup seizes is the presence of TSRs in memory while you're trying to install Windows. If you receive such a warning during Setup, exit Setup, and remove the TSR from CONFIG.SYS or AUTOEXEC.BAT. To do this, make backup copies of AUTOEXEC.BAT and CONFIG.SYS, then try this:

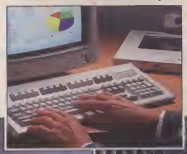
1. Open CONFIG.SYS with a text editor and type REM in front of all lines except for the following ones: those that begin with Files or Buffers; those that load device drivers that are necessary for the operation of your computer, such as drivers for compressed drives; and those that refer to either SMARTDRV.EXE or /DOUBLE_BUFFER. Save your changes when you're done editing the file.

2. Do the same to your system's AUTOEXEC.BAT file, only this time type REM in front of all the lines except those that begin Path, Prompt, or Set Temp. Save the changes when you're done, and quit to DOS.

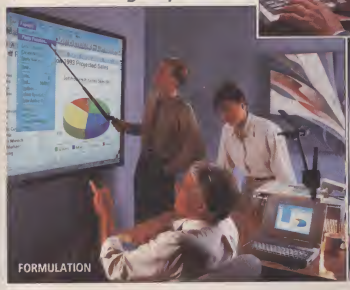
3. Restart your PC, and rerun Windows Setup—it shouldn't give you any more trouble. Once Setup has installed Windows, reinstate the lines that load TSRs and device drivers by removing the REM statements.

Fred Davis is a columnist for Windows Sources *and the author of* The Windows 3.1 Bible, *published by Peachpit Press (1993).*

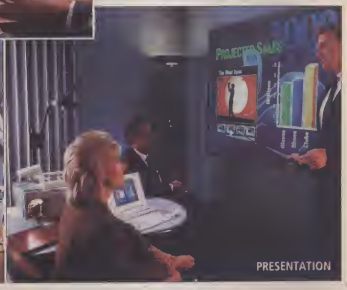
From Your Desktop...



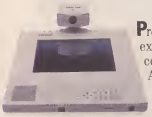
To The Workgroup...



To The Boardroom...



Proxima® brings the power of your computer to the meeting room.



Proxima LCD projection products extend the reach of your desktop computer into the meeting room. And that means fewer, more productive meetings! Using the tools and data you already have at your desk, you can project precisely the same images you see on your computer screen. In brillant color. For all to see.

Desktop Projection™

Think of it as "Desktop Projection"—the link between your computer and the workgroup. Desktop Projection lets you focus everyone's attention on the large screen. A Desktop Projection solution allows the entire group to explore "what-if" scenarios, perform on-the-spot problem solving, or fine tune ideas in brainstorming sessions.

DESKTOP PROJECTION

And once you have formulated your concepts in the workgroup, you can present them at meetings, training sessions, or boardroom presentations. You can even augment presentations with video by connecting a video source, such as a VCR or laserdisc, to a Proxima projection system.

It's all so easy!

Just plug the Proxima LCD projection product into the video port of your IBM® PC or compatible or Apple® Macintosh®. Your presentation, project management, spreadsheet, or multimedia software is now on-line—without the need for flip charts, 35-mm slides, or overhead transparencies.

Just set the panel on an overhead projector.

And with Proxima's unique Cyclops™ pointer system, you get all the capabilities of a cordless mouse—and more. Simply touch the wand to your projection screen, point and click to control your computer right at the projected image. With Cyclops, you will add an element of magic and excitement that will captivate your audience!

Whether your meeting is in a conference room, classroom, or auditorium, Proxima has a Desktop Projection solution to meet your needs. To find out more about Desktop Projection and how to run more effective meetings, call our toll free number today.

(800) 447-7694

PROXIMA®

Circle 171 on reader service card.

Proxima Corporation *6610 Nancy Ridge Drive • San Diego, CA 92121-3297 • (619) 457-5500. In Europe: Horsterweg 24 • 6191 RX Beek • The Netherlands • +31 43 65 02 48*
Proxima is a registered trademark and Cyclops and Desktop Projection are trademarks of Proxima Corporation. Other trademarks are the property of their respective owners.

'Out of Memory' Error? Don't Believe It

Recover RAM without getting your hands dirty. BY RON WHITE

Windows craves memory. The more memory it controls, the faster Windows applications run. And faster Windows means . . . well, let's be honest here, that's what we're all after, isn't it?

The key to squeezing the most RAM possible out of your system lies in understanding four expressions: The first one is *upper memory.* The second one is *extended memory.* The third is *stuff it.* The fourth is *aw, let the memory manager do it.* Now, we realize that these are technical terms, but they're worth learning because the proper application of the concepts behind these terms gives Windows the most memory you can squeeze out of any PC—and that's the name of the game.

HIGHLIGHTS

- Fine-tune MemMaker.
- Clear memory errors.
- Put UMBs to work.
- Reclaim program RAM.
- Isolate parity errors.

UPPER MEMORY

Upper memory refers to the area of memory in a PC between the 640K of conventional RAM (used for DOS programs) and the 1,024K mark. That 384K stretch of memory is not physically located in any banks of RAM chips, as most other memory is. Instead, its addresses are apportioned out to ROM BIOS addresses occupied by video adapters, drive controllers, network cards, and other hardware devices hooked into your system.

What makes upper memory so handy is that not all the memory addresses in that 384K of upper memory are used by hardware BIOSes. Addresses that aren't in use can be remapped by a memory manager and recognized by your system as extended RAM (see "How a Memory Manager Works" on the facing page). The memory manager can then take these remapped regions of upper memory (called UMBs, or upper memory blocks) and load TSRs and device drivers into them. Each TSR or device driver that's loaded into upper memory frees up memory in conventional RAM's 640K so that it can be put to better use by Windows. Finally, the memory manager can then take the remaining UMBs and remap them as extended memory.

EXTENDED MEMORY

The key thing to remember about extended memory is to buy more of it—lots more. The more extended RAM your system has, the faster and smoother Windows runs. This is because some portions of a program may be in physical memory while other portions are still residing on disk in a *swap file,* a large hidden disk file that Windows treats like RAM. When a program makes a reference to a memory address that's in physical memory, the application just grabs the data and moves on. But if the address is really located in a swap file in virtual memory on your hard drive, Windows must write to disk some other data in memory and replace it in RAM with the new data from disk. Disk swaps are the biggest time wasters in your PC, and a generous supply of extended memory keeps disk access to a minimum.

At this point, someone is going to notice that we haven't gotten into expanded (or EMS) memory. Although much of the design of a memory manager is devoted to creating and handling expanded memory, EMS memory is basically antiquated—it's important today only in making some aging DOS programs run faster. Our advice? Avoid DOS programs that require EMS memory. You can put the RAM to better use as extended memory for Windows applications.

STUFF IT

The third thing to understand about memory management is loading high—a process we call stuffing it. You want to stuff as many TSRs and device drivers as possible into upper memory—thereby freeing maximum conventional memory. This is easier said than done. Some TSRs and drivers can be cantankerous about the order in which they're loaded, what they're adjacent to in memory, and how much memory they *really* need

SUPER TIP Don't know what interrupt or memory ranges your hardware uses? Run MSD.EXE, a DOS-based diagnostic utility found in your Windows directory. It provides information on the interrupts and memory usage of both software and hardware. But be sure to exit Windows before using MSD because Windows plays tricks with memory that may give you inaccurate results.

to be loaded high. There's also a chance you'll load something into upper memory that some other device insists on claiming as its own.

Fortunately, there's a great solution for nearly hassle-free use of upper memory: memory managers.

AW, LET THE MEMORY MANAGER DO IT

All memory managers have utilities for analyzing your system's use of memory and addresses and for determining which TSRs and device drivers can be loaded high and where. For example, the utility provided with DOS 6.0 is called MemMaker. The simplest way to load high is to let a memory manager do it for you.

Of course, memory-configuration utilities have their limits. Although they do an admirable job, they won't always give you the absolute optimal configuration. In years of using third-party memory managers, such as QEMM-386, 386Max, and Netroom, we've always found

HOW A MEMORY MANAGER WORKS

EMM386.EXE reclaims every last byte of RAM.

1. The memory manager included with Windows, EMM386.EXE, loads into a PC's memory via CONFIG.SYS at startup. Once loaded, it inspects the PC's upper memory area. Any unused areas are marked for use as *upper memory blocks*, or UMBs.

2. EMM386.EXE now tries to free as much conventional memory (RAM below the 640K mark) as possible by moving hardware device drivers and TSRs into these UMB slots—a process called *loading high*. (DOS itself can load into the high memory area, a 64K chunk of RAM just above the 1MB mark.)

3. Any remaining UMBs are treated as extended memory that's available to any Windows application.

that some manual tweaking improves the amount of memory you can reclaim for applications. The exact settings for best performance can vary widely from PC to PC, so don't be afraid to call the software publisher for help.

Q DOS 6.0

How do I optimize memory for Windows using the memory manager supplied with DOS 6.0?

A: MemMaker automatically tests the high memory area between 640K and 1MB to determine what memory addresses aren't being used, loads TSRs and device drivers high, and remaps available upper memory as extended RAM. Launch MemMaker from DOS by first rebooting, then typing MEMMAKER at the DOS prompt. When MemMaker loads, choose Custom Setup. On the Advanced Options screen, choose Yes in response to the "Optimize upper memory for use with Windows" prompt.

SUPER TIP If you run into problems after running MemMaker (memory error messages or system lockups, for example), undo the changes made to CONFIG.SYS and AUTOEXEC.BAT by running MemMaker a second time. This time, however, type MEMMAKER /UNDO to load the utility. When MemMaker's menus appear, choose Custom setup again and on the Advanced Options screen, choose No in response to the "Scan the upper memory area aggressively" prompt. You won't free quite as much conventional memory, but your programs should run.

Q LOW MEMORY

Windows reports that there's not enough memory to load an application, yet I have 16MB of RAM in my system. Why?

A: There are two ways you can run out of memory using Windows. One is to simply run out of available RAM; the other is to run out of memory devoted to system resources. Running out of either can make it difficult or impossible to load an application or run some of its features.

Running out of RAM. If you're running Windows in 386 Enhanced mode, you can actually have more memory available than you have RAM installed because Windows supports *virtual memory*—a large hidden disk file, called a *swap file*, that Windows treats as if it were RAM. In this case, with 16MB of installed RAM, it's unlikely that you're running out of main system memory—even without a swap file, 16MB should handle half a dozen Windows apps and utilities easily.

Running out of system resource memory. The most likely culprit is low system resources. System resources are three 64K RAM storage areas called *local heaps* that Windows uses to manage menus, user input, icons, and the like. When these local heaps get low, you can run into memory problems. To check the status of your system resources, choose Help from Program Manager's menu and click on About Program Manager. The amount of free system resources will be displayed as a percentage. Whenever you have less than 30 percent free, you can run into memory problems, the most serious of which occurs when you don't have enough resources to save a file.

One way to free up resources is to shut down some of the applications you're using. Less obvious wasters of system resources are icons and windows. You can run out of system resources using only Program Manager if you have your screen plastered with icons and open group windows. Reclaim this RAM by shutting down program groups you're not using or by putting your most frequently used application icons into a single group.

Q EMS MEMORY

How do I reserve expanded memory for my DOS applications?

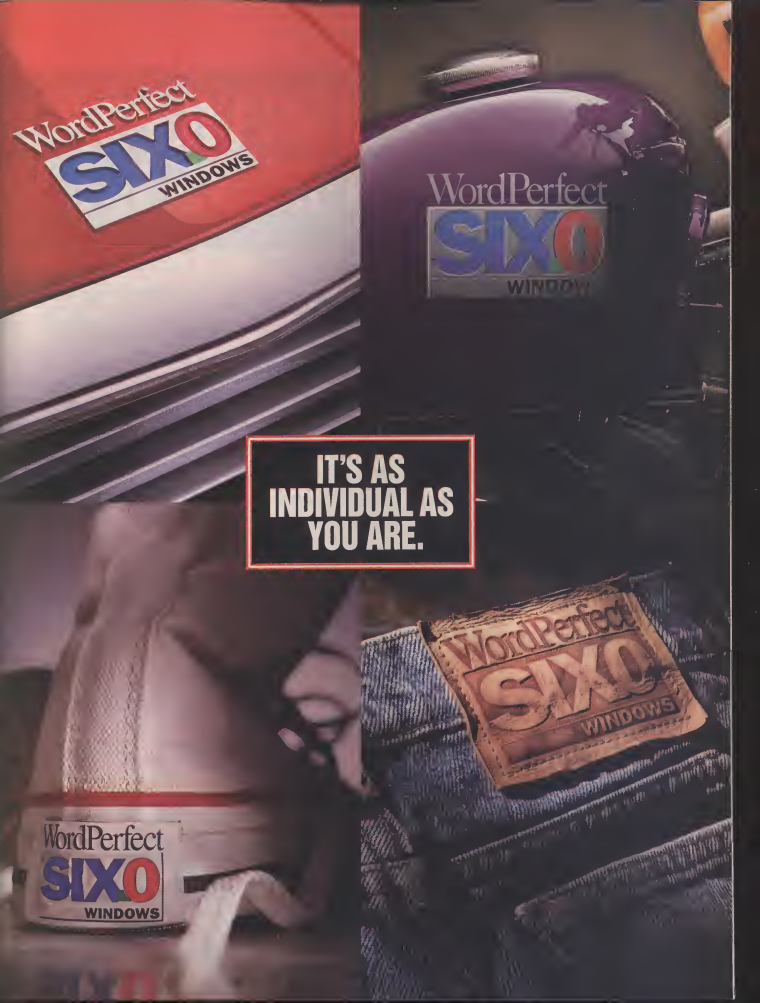
A: Create a PIF (program information file) for the DOS program by using Windows' PIF Editor. To do this, load PIF Editor, and in the box labeled EMS Memory, enter the number of kilobytes of EMS RAM that you want to reserve for that program. For example, if you need 2MB of expanded RAM, enter 2048. (See the section "Using DOS Under Windows? Learn to Love the Prompt" on page 259 for more information on PIFs.)

Q PARITY ERRORS

My PC occasionally reports a memory parity error. What's causing this?

A: Memory parity error messages almost always point to hardware problems such as faulty memory chips, mismatched RAM chip speeds, a memory conflict (as when you install a new video card or other peripheral) or a faulty power supply. If you've recently installed a new hardware device, suspect a memory conflict first and check its configuration. If you've recently installed new memory, a bad memory chip or mismatched memory speeds are likely. Check for faulty memory chips using a diagnostic utility such as Touchstone's CheckIt Pro. Failing these, you may need to replace your system's power supply, which will set you back $75 to $250, depending on the model you choose.

SUPER TIP If you run out of memory only when running a certain program, the application may have a bug in it that keeps it from freeing system resources when it finishes an operation—or even after you exit the application entirely. A temporary fix is to exit the program and restart Windows. A better fix is to call the company that created the program and complain loud and long about its irresponsible programming. The company may have an updated version of the application that resolves the problem.


WordPerfect
SIX0
WINDOWS
WordPerfect
SIX0
WINDOWS
IT'S AS
INDIVIDUAL AS
YOU ARE.
WordPerfect
SIX0
WINDOWS
WordPerfect
SIX0
WINDOWS

INTRODUCING WORDPER
IT'S WINDOWS THE W

Of all the things people do with personal computers, word processing may be the most personal.

Nobody writes the way you do. Nobody gets the same assignments or tackles them the same way. And nobody understands that better than WordPerfect®, the worldwide word processing leader.

That's why we're excited to introduce WordPerfect 6.0 for Windows. We didn't design it to be the perfect writing tool for the *average* user. We designed it to be the perfect writing tool for *you.*

MAKE IT YOUR OWN.

Which features of your word processor do you use most often? Are they organized so that you can get at them quickly?

WordPerfect 6.0 gives you direct, one-click access to *any* command, process or macro in the program. Just drag your favorites to a context-sensitive Button Bar™ and arrange them any way you like.

You can even drag in other Windows applications and files and launch them from within WordPerfect. (How's that for easy integration?)

How it looks is up to you. Because every aspect of the WP interface can be easily customized.

You can quickly create customized interfaces to streamline the writing of reports, memos or letters. Or you can simply use any of 70 professionally designed ExpressDocs™ templates included in the package.

And it's not just commands you're in command of. Virtually every element of the interface — including how it looks and feels—is yours to do with as you will.

Now, you can create 3-D charts from table and spreadsheet data without ever leaving WordPerfect.

It's the most easily customized word processor ever to come out of a box.

* LIMITED TIME OFFER WORDPERFECT IS A REGISTERED TRADEMARK OF WORDPERFECT CORPORATION WITHIN THE UNITED STATES AND OTHER COUNTRIES
ALL OTHER BRAND AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES © WORDPERFECT CORPORATION 1993

FECT® 6.0 FOR WINDOWS.
AY YOU WANT IT TO BE.

GETTING HERE WILL BE EASY.

With more than 100 built-in spreadsheet functions and advanced charting and drawing capabilities, this is the most powerful program WordPerfect has ever developed. But how difficult will it be putting all this power and flexibility to work?

If you've used WordPerfect on another operating system, you and your existing documents and macros will feel right at home here. This is the WordPerfect you know, in a friendlier, more accommodating environment.

There's an on-line tutorial for first-timers, of course. But there are also interactive Coaches smart enough to lead you step-by-step through sophisticated operations, not on *sample* documents, but on *your* documents. And if you have any questions, WordPerfect's support people (widely acknowledged to be the best in the business) are standing by to help.

THE BEST REASON FOR MOVING TO WINDOWS.

This is everything WordPerfect has learned about word processing over the years, combined with all the advanced ease-of-use capabilities of the Windows environment.

It connects your documents directly to other powerful Windows applications, and to the rest of the business world. And the power of WordPerfect 6.0 is all yours.

Borland®
Quattro® Pro 5
INSIDE SPECIALLY MARKED BOXES*

To claim it for yourself, visit your local reseller and ask about the special introductory offer with Quattro Pro 5.0. For a free demo disk or to order directly, call WordPerfect at (800) 526-5163.

- Document templates
- Spreadsheet functions
- Interactive Coaches
- Sophisticated drawing tools
- Direct spreadsheet import
- Document management
- Graphics editing
- Irregular text wrap
- Borders
- Full WYSIWYG in all views
- Power bar
- Indexing and text retrieval
- Quickmenus
- Direct database import
- Styles
- Macros
- Auto macro conversion

WordPerfect®

6.0 FOR WINDOWS™

Putting Ink to Paper Needn't Be Such a Chore

Quick solutions to common printing problems. BY MARTIN MARSHALL

You know you're having printing problems when you begin to eye your typewriter—longingly. Worse, you consider writing things out by hand—anything to avoid printing from Windows. You're not alone. Sooner or later, everyone has Windows printing problems. That said, you should also know that most printing problems are really just configuration problems—easily resolved if you know where to look.

HIGHLIGHTS

- Update printer drivers.
- Optimize Print Manager.
- Test PostScript printers.
- Print direct to port.
- Configure multiple printers.

Everything that you need to control printing from Windows is located either in Windows' Control Panel under the Printer icon or in Print Manager. To master printing under Windows, you need to become familiar with a straightforward printer setup procedure to add your printer to Windows. Then, if you're using multiple printers, you'll need to get acquainted with the Printer Selection feature. Once the printer is installed, you may also occasionally need to check in with Print Manager on the status of print jobs.

PRINTER SETUP

To set up your printer, you need to select two things: the printer driver and the printer port. Other options change only if you have trouble printing from the defaults or if you're tuning your printer setup for a particular graphics resolution or performance.

Printer drivers. If your new printer comes with a Windows driver on a floppy, that's the driver to use. If no driver floppy accompanies your printer or if you're not connecting a new printer, then Windows probably already has the one you need in its inventory of drivers. Either way, to add a Windows printer driver to your setup, fire up the Printers icon in Windows' Control panel and click on Add. Windows lists more than 250 printers in its Add Printer list—select the model name of yours, and click on the Install button to the right of the list. Windows takes care of the rest.

To install the drivers that come on a floppy with your printer, select the first item on the Add Printer list, labeled Install Unlisted or Updated Driver, and click on the Install button. Windows steps you through the process and prompts you for floppies.

Printer ports. The printer port is the physical and logical connector through which your computer and printer communicate. The default setting is LPT1 (your parallel port), though you can also select another parallel port such as LPT2 or a serial port (COM1, COM2, and so on) for local or network connections. If only one printer is attached to your system, then the chances are good you should select LPT1.

If you're connecting to a network printer, you must ensure that Windows has been configured for network printing. Click on the Printers icon, then click on the Connect button. See if the Network button is grayed out in the Connect dialog box. If it is, go to Windows Setup in the Main group and change the system settings for network from the default No Network Selected to the network of your choice.

THE PRINTER SHUFFLE

After you've installed the Windows printing connections to your local parallel port printer on LPT1, to the fast network printer down the hall, and to that snazzy color printer in the art department, you'll want to be able to switch between them easily. You can do this either from the Control Panel's Printers icon or from within the Windows application that you're using.

SUPER TIP Reinstalling printer drivers corrects most of the printing problems you encounter with TrueType and third-party fonts—and many other printing problems.

To change the printer from outside the application, go to Control Panel's Printers dialog box. Under Installed Printers, highlight the printer you want, then click on OK. All Windows applications will now send their print jobs to the selected printer. To change the printer from within an application, pull down the program's File menu and select Print Setup. Highlight the printer you want, then click on OK. Changing printers this way also switches all other Windows applications to that printer.

PRINT MANAGER

Whereas the Printers setting in Control Panel handles printer configuration, Print Manager oversees the mechanics of relaying your print request from your application to the printer. Print Manager's primary purpose is to intercept print jobs and route them to the proper printer in the background so that you can continue working in your application (See "Print Manager in Action," below, for details on how this works). Most of the time you don't even know it's there.

Print Manager comes in handy when you need to check on the status of your document in the queue, redirect a file to a different printer, delete a print job that hasn't printed yet, or change the priority of print jobs (so that your single-page memo prints before your graphics-laden spreadsheet, for example). Print Manager also allows you to choose how much of your CPU's processing time you want to devote to background printing and how much to the foreground application.

Q CAN'T PRINT

What do I do if I can't print from any of my Windows applications?

A: Any link in the hardware and software chain may be at fault. Provided your printer is plugged in, stocked with paper, and ready to roll, you can narrow down the problem in three steps:

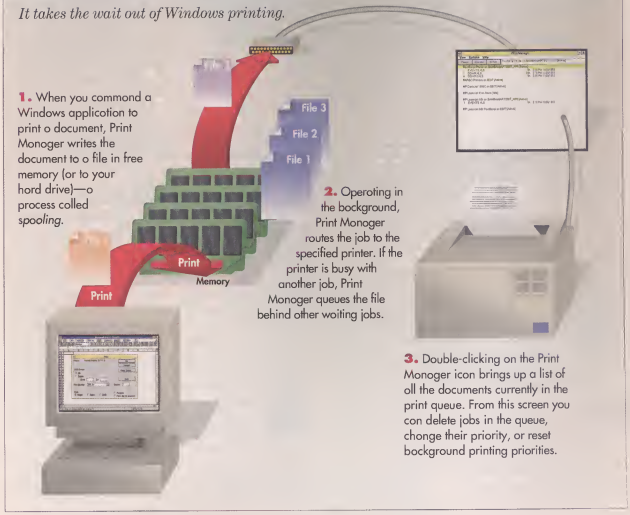
Try printing from DOS. If you can't print from DOS, you won't be able to print from Windows either. Exit Windows entirely and try to print a page from the DOS prompt. You do this by typing:

```
dir > LPT1:
```

If you have a dot matrix printer, it should start printing immediately. If you have a laser printer, you may see the Ready light flash but no paper come out. Press the Online button to take it offline, then hit the Form Feed button to eject the page. If you can't print from DOS, something is wrong with the connection between your PC and the printer. Check the cables or try printing from another port.

PRINT MANAGER IN ACTION

It takes the wait out of Windows printing.



1. When you command a Windows application to print a document, Print Manager writes the document to a file in free memory (or to your hard drive)—a process called *spooling*.

2. Operating in the background, Print Manager routes the job to the specified printer. If the printer is busy with another job, Print Manager queues the file behind other waiting jobs.

3. Double-clicking on the Print Manager icon brings up a list of all the documents currently in the print queue. From this screen you can delete jobs in the queue, change their priority, or reset background printing priorities.

Turn off Fast Printing Direct to Port. If you can print from DOS, the next step is to turn off the Fast Printing Direct to Port option. To do this, select Control Panel's Printers icon and click on the Connect button. Deselect Fast Printing Direct to Port, which tells Windows to bypass normal DOS interrupts and send data to the printer directly. Turning it off will slow printing, but it may also resolve the problem.

Reinstall or replace your printer driver. Failing the above, suspect a faulty or outdated printer driver. You can confirm this by trying another generic printer driver such as the HP LaserJet driver (virtually all laser printers support it in some fashion) or an Epson driver (virtually all dot matrix printers support this driver). If using another printer driver works, delete the old driver for your printer and reinstall it or contact the manufacturer for a driver update.

Q PRINT TEST

How can I quickly test printing to a PostScript printer?

A: First check to see if your PostScript printer (usually connected to a parallel port such as LPT1) is properly connected. You can do that by typing the following commands:

```
COPY CON LPT1:
showpage
```

(Substitute the port to which the PostScript printer is attached if it's not LPT1.) When these commands have been entered, press Ctrl-Z and hit the Enter key. If the connection between the printer and the computer is good, a blank page ejects from the printer.

Next, see if it can print a PostScript file that is transferred via the DOS COPY command. Copy the TESTPS.TXT file (located in the Windows System directory) to the printer port by entering:

```
COPY C:\WINDOWS\SYSTEM\TESTPS.TXT LPT1:
```

(Substitute the proper port if it's not LPT1.)

Q PRINT MANAGER

When does it make sense to disable Print Manager?

A: When Print Manager is enabled, all print jobs are routed through it before they go to the printer. If your system is extremely low on system resources (Print Manager can take up 50K of memory or more—even when it's idle) or has very little free disk space, you may want to disable it. This may also improve your system's performance if it frequently runs out of memory.

Another time you might want to disable Print Manager is when you're using a third-party print spooler such as LaserTools' PrintCache, which gives you more control over printing documents and, in some cases, better performance.

SUPER TIP Print quickly from File Manager. Select a file, then drag it onto a minimized Print Manager icon to automatically print documents.

Q PRINT TO PORT

How does Windows send Printer commands to a port?

A: Whether Print Manager is enabled or disabled, Windows has several methods for sending printer commands to a printer port. Windows' graphics device interface (GDI) or Print Manager determines how to print the file by examining the configuration of the port. If the port is connected to a network printer, the network driver creates a print job on the network spooler. GDI or Print Manager then uses DOS to write data to the network spooler.

If the port is recognized by the Windows communications driver and the Fast Printing Direct To Port option is turned on, GDI or Print Manager uses the communicating driver to send the printer data to the printer.

SUPER TIP Give Print Manager priority. To change the amount of system processor time allocated to Print Manager, set its priority level under the Options menu. The Low Priority selection gives Print Manager less processor time; this slows down the printing process but speeds foreground applications. Medium Priority gives equal processor time to Print Manager and other applications. High Priority gives Print Manager more than half of your processor's time, speeding up Print Manager but causing your other applications to run slower.

Q DIRECT TO PORT

What does Fast Printing Direct to Port do?

A: Choosing this option (access it by selecting Printer Setup, Connect under Printers in Control Panel) tells Windows to print using the Windows communications driver whenever appropriate. This driver supports faster printing than DOS does by writing directly to the COM or LPT port hardware, bypassing the normal DOS output code path. If special print TSRs are in use or you have problems printing over a network, disable Fast Printing Direct to Port.

Q NETWORK DIRECT

What does Print Network Files Direct do?

A: This option, under Network Settings, stops Print Manager from spooling network jobs on the local hard drive and allows local jobs to be spooled as normal. If the server supports print spooling, this option saves disk space when you're printing to a network printer without affecting the print speed or the time the application is suspended. This option is active by default. Disable it if you get network error messages or if it slows printing.

"ECCO Professional is a Personal Information Manager, but that's like calling Michael Jordan a basketball player... You'll find yourself living in it."
—Paul Andrews, Computer Columnist and Co-Author of "Gates," 5/93

"Terrific! Easiest to use. Startling power. This is a program to get excited about."
—Jonathan Blackwood, Windows User, 7/93

"I'm actually putting my life into ECCO. That's how compelling it is... An incredible interface that absolutely positively urges you to tie information together in just the ways you need to view it."
—Kevin Strehlo, Executive Editor, InfoWorld, 5/93

"Best Buy."
"For scheduling... for phone book data... for truly powerful personal data management, there's nothing better... The ultimate in linking information."
—Daniel Tynan, PC World, 8/93*

"ECCO is the most important and unique advance in the category."
—Tim Bajarin, Noted Analyst, Creative Strategies, 5/93

"ECCO Professional represents a new frontier in Windows-based personal information managers."
—Brad Grimes, PC Magazine, 6/93

"The Outlook gives ECCO Professional our Best Buy recommendation."
—Andrew Seybold, Outlook on Mobile Computing, 5/93

We're not the only ones calling it a SuperPIM.™

ECCO.™ Because an organized life is an easier life. Sure, computers have made certain things easier—writing letters, creating charts, that sort of thing. But what about the rest of your day? Making calls, preparing for meetings, appointments, coordinating projects, and gathering random thoughts—then finding them again?

That's what ECCO, the world's first SuperPIM™ (personal information manager) for Windows is all about.

ECCO Professional goes beyond traditional PIM and contact manager functionality, giving you a tightly integrated calendar, phonebook, to-do's and outliner. Plus, it lets you quickly organize and cross-reference all your information. So you see it where you need it, when you need it.

ECCO PROFESSIONAL
*The original SuperPIM. SRP $305.***
ECCO SIMPLICITY
SuperPIM SuperEasy SuperPrice. 90-day intro. offer $79.
Call 1-800-457-4243 ext 25.

Now there's also new ECCO Simplicity. It's the SuperEasy way to start using the power of a SuperPIM. You get our core calendar, phonebook, to-do's and outliner. And at $79 (intro. offer), you get a SuperPrice. So try it.

ECCO won't just change the PIM category—it'll change your life.

Arabesque™ Software, Inc.

©1993 Arabesque Software, Inc. (206) 885-4272. All trademarks are property of their respective owners. *Reprinted with the permission of PC World.**U.S. prices. Subject to change.

Circle 118 on reader service card.

AT 9 A.M. HE DIDN'T KNOW HOW TO WORK WITH A DATABASE.

When Don Glor came to work on the morning of September 15* he'd never used a database before. Two hours later he'd developed his first application — it looks like a fire truck: actually it's a customized inventory and billing management system for the South County Fire Department, San Mateo County, CA.

Don was using Lotus® Approach™ — the only database designed for fire fighters. And lawyers and doctors and business people. And anyone who isn't necessarily a computer expert.

Approach lets you get to work right away in familiar, easy to understand desktop items. You can generate reports, forms or form letters — you can even print mailing labels to match any specification

INTRODUCING APPROACH 2.1. THE RELATIONAL DATABASE ANYONE CAN RELATE TO.

All the power and functionality in the world is no good if you can't use it. Approach is expressly designed to be easy. There's no programming to learn. No endless documentation to study. And according to independent research, "The average Approach user produces real results with their database in 2 hours."†

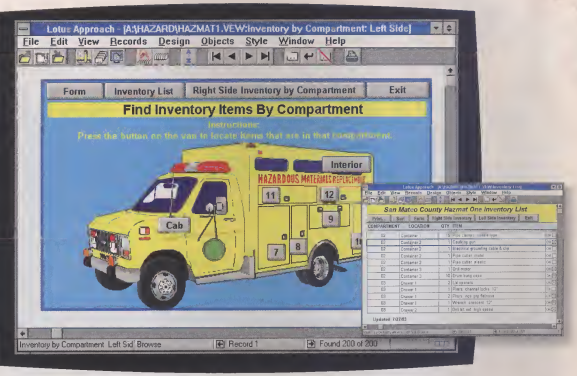
This will surprise anyone who has tried to work with databases like Paradox® or Access®. According to Don, "I tried Access and shelved it. It was just too difficult to get a handle on." That's not surprising considering the 543 page supplemental language reference for programmers. Don would've had to pore through. Which looks like light reading next to Paradox's 1300 pages of programming instruction.

The difference is that their products were not designed for general business users.

With Approach you have database power that really is accessible, and you work in one of four familiar, desktop items — reports, forms, mailing labels or form letters — that look and work just like you expect them to, to help you be productive right out of the box.

Approach has won over 21 major industry awards and accolades

*Approach has won over 21 major industry awards and accolades



AT 11 A.M. HE WASN'T SURE HOW HE'D EVER WORKED WITHOUT ONE.

NOTHING THIS EASY HAS EVER BEEN THIS POWERFUL.

Just because Approach is easy to use doesn't mean it's not powerful. This is a fully relational client/server database that received a perfect 5.0 score from *PC Week Labs* in both "ease of use" and "performance."*

And with Approach, access to existing databases is only a mouse click away. Our PowerKey™ technology lets you work with dBASE,® Paradox, FoxPro,® Oracle® SQL, SQL Server and DB2®** data in its native format. With no filters and no imports involved.

Letting you transparently share data across multiple databases and all popular networks with unsurpassed speed and flexibility.

NOTHING THIS POWERFUL HAS EVER BEEN THIS AFFORDABLE – JUST $99.

For just $99*** you can experience the database that *PC/Computing* called "the most usable Windows™ relational database ever."** But, this great introductory price for new Approach 2.1 won't last forever. Call **1-800-TRADEUP, ext. 9107** today or visit your Lotus Authorized Reseller to take advantage of this limited time offer. And discover the powerful relational database expressly designed for end users. Like Don Glor. And you.

Lotus
Working Together™

*1992. Using Release 2.0. Market Probe International, New York, NY, February 1993. **PC Week Labs, 11/2/92. *Requires Micro Decisionware Gateway. **PC/Computing, August, 1993. ***Plus shipping and handling if applicable. Offer good through 12/31/93. ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. Lotus and Working Together are registered trademarks of Lotus Development Corporation. Approach and PowerKey are trademarks of Approach Software Corporation, a wholly-owned subsidiary of Lotus Development Corporation. Microsoft Access and FoxPro are registered trademarks and Windows is a trademark of Microsoft Corporation. Paradox and dBASE are registered trademarks of Borland International Inc. Oracle is a registered trademark of Oracle Corporation. DB2 is a registered trademark of International Business Machines Corporation. In Canada call **1-800-GO-LOTUS**.

Don't Let Windows Hold Your Type Fonts Hostage

Tame fonts, find corrupt font files, and more. BY MATTHEW LAKE

You don't have to subscribe to the ransom-note school of typography to realize the perils of Windows fonts. Load too many on your system, and Windows takes a century to load, your printer chokes and spits out only half a page, your hard drive screams for mercy.

HIGHLIGHTS

- Root out corrupt fonts.
- Disable ATM.
- Select TrueType fonts.
- Replace system fonts.
- Add and delete fonts.

To get a handle on Windows fonts, you need to know the differences between the three varieties—raster, vector, and TrueType fonts.

THREE FONT TYPES

Windows' raster and vector fonts are found in the Windows System subdirectory in files with the .FON extension. TrueType fonts are actually made up of two files—a file with the extension .FOT resides in the Windows System subdirectory and points to a file with the extension .TTF in the same subdirectory.

Raster fonts. These fonts (MS Serif, MS Sans Serif, Courier, System, and Terminal) contain bitmaps supplied in different fixed sizes. A raster font file contains data that describes all the font's characters and styles (bold, italic, underline, and so on) but only in fixed point sizes, usually 8, 10, 12, and 14.

Vector fonts. These fonts (Roman, Modern, and Script), on the other hand, can be scaled to virtually any size using a basic connect-the-dots mathematical technique. They are stored in Windows as collections of graphic device interface (GDI) commands and are best used for plotters, not laser printers, because the scaling is so basic they generally don't look as good as raster fonts of the same size. Some Windows applications automatically use vector fonts at larger sizes. These applications often allow you to specify at what point size you want to use vector fonts. For example, Aldus PageMaker's Vector Above setting specifies the point size at which PageMaker switches to vector fonts.

TrueType fonts. These fonts, which were introduced in Windows 3.1, use an outline font technology that offers several advantages over vector and raster fonts. You can scale and rotate TrueType fonts, and they look good in all point sizes. The TrueType font you see on your screen also matches what eventually makes it to the printer. For most Windows tasks, they're your best choice.

MY TYPE IS TRUE

The TrueType fonts that come with Windows 3.1 are Arial, Courier New, and Times New Roman—each available in regular, bold, bold italic, and italic style. There are also two symbol fonts, Symbol and WingDings. Additionally, many Windows applications come with their own collection of TrueType fonts, which you can share across all Windows documents.

Each TrueType font is installed in two stages from two different font files. The font file with the extension .FOT is loaded from the Windows System subdirectory at startup. When you apply a TrueType font in your documents, the FOT file that was loaded at startup points to the rest of the font information—a file with the same name but the extension .TTF. The TTF file is, in effect, a compiled programming language that contains all the information needed to build any character of a given font at any size. The only caveat is that different .TTF files are needed for different styles, such as bold and italic, which means that you forfeit disk space.

The principal difference between scalable outline fonts such as TrueType and scalable vector fonts is a technology that's called *hinting*. In both scalable outline and scalable vector technologies, outlines must be converted to bitmaps before they're sent to printers and monitors—and without hinting, curves and diagonal lines look rough. This is because parts of a font outline don't map precisely to a pixel—some parts of a curve are wider than the original outline, and some

SUPER TIP Can't get a font to work? The font file may be corrupt. Check this by opening Control Panel's Fonts icon and clicking on the name of the font. If you can't see a preview of the font or if the font file size is listed as zero K, the file is corrupted. Remove the font from your system (select the Remove Font from Disk option) and reinstall it from its original floppies.

Eclipse FAX: If It Were Any Faster, You'd Have To Send And Receive Your Faxes Internally.

Here's the inside story on Eclipse FAX - the fastest, easiest Windows fax software available today. With Eclipse FAX, you save time since all your faxing is done from your own personal computer. You can fax to or receive from any fax machine and easily track, file, mark-up and store your faxes.

With a click, you can send or receive a fax - even if you're in a word processor or other Windows application - without being interrupted. And Eclipse FAX also includes OCR, which converts your faxes into editable text.

Of course, the nature of fax software has other unbeatable benefits. Like the ability to annotate and type comments on faxes with your PC; the ability to print out plain paper faxes from your PC; and the privacy and convenience of faxing from your own personal computer.

If you already own a fax software program, we'll let you trade up to Eclipse FAX for just $59*. So pick up Eclipse FAX, because to fax any faster, you'd have to break a few laws. Of physics.

Phoenix

1-800-452-0120

Phoenix Technologies Ltd. 846 University Avenue, Norwood, MA 02062

©1993 Phoenix Technologies Ltd. Available now at Egghead, Comp USA, Computer City and other dealers.

*Competitive upgrade offer

12/8/93 1993

Circle 228 on reader service card.

are narrower. The result is uneven curves and serifs, especially at low point sizes and resolutions.

To solve this problem, hinting algorithms systematically adjust a scaled outline to yield a smoother-looking bit-mapped image. Only after hinting does the GDI send the TrueType characters to the screen or to the printer. For more details, see "The ABCs of Windows Fonts," below.

Q TRUETYPE FONTS

What are the practical advantages of using TrueType fonts?

A: TrueType fonts have many benefits over other kinds of Windows fonts:

TrueType offers Wysiwyg (what you see is what you get) font output. Windows uses the same font for both the video display and printer.

You can scale and rotate TrueType fonts without losing resolution. TrueType fonts look good in all point sizes and on all output devices (video display, printer, and so on) that Windows supports.

Your document fonts look the same, regardless of the printer you're using. And any printer that uses the Windows 3.1 universal printer driver can print TrueType fonts.

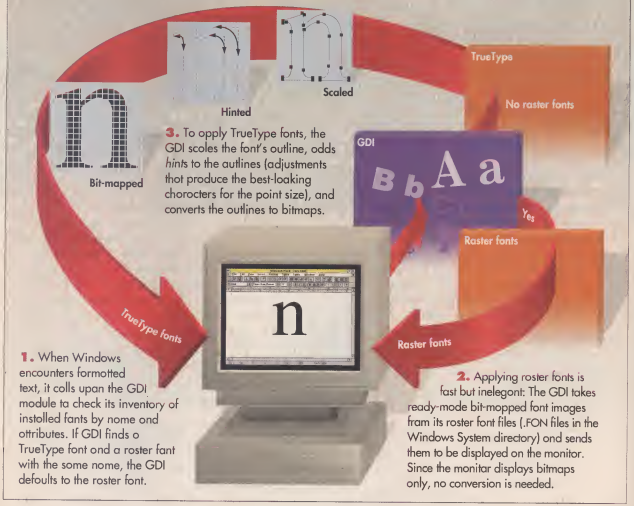
TrueType fonts appear the same across different platforms. Because Macintosh systems use the same TrueType font technology that PCs do, the text that you format in a Windows application will look the same if you open the document in a Macintosh application.

TrueType fonts require less disk space. Each TrueType typeface requires only an .FOT file and a .TTF file in order to create fonts in all point sizes at all resolutions

SUPER TIP Be selective about the fonts you install on your system. Having fewer fonts not only saves disk space but also speeds Windows' load time since it has to initialize all installed fonts each time it starts.

THE ABCs OF WINDOWS FONTS

Scaling and hinting improve the look of TrueType.



1. When Windows encounters formatted text, it calls upon the GDI module to check its inventory of installed fonts by name and attributes. If GDI finds a TrueType font and a raster fant with the same name, the GDI defaults to the raster font.

2. Applying raster fonts is fast but inelegant: The GDI takes ready-made bit-mapped font images from its raster font files (.FON files in the Windows System directory) and sends them to be displayed on the monitor. Since the monitor displays bitmaps only, no conversion is needed.

3. To apply TrueType fonts, the GDI scales the font's outline, adds *hints* to the outlines (adjustments that produce the best-looking characters for the point size), and converts the outlines to bitmaps.

INTRODUCING THE PERFECT WAY TO GET AHEAD AT THE OFFICE.

C·H·E·A·T.

NEW MOUSEMAN® CUTS NEARLY 50% OFF THE TIME IT TAKES TO EXECUTE ROUTINE COMMANDS.*

Get a leg up on those other Joes with the mouse that makes it easy. MouseMan comes with software that lets you execute one of dozens of commands (including double click) with a single click, *without* fiddling with pull-down menus. We've taken the shape 77% of users called "most comfortable" and added finger grooves, lower force switches, teflon feet, and a more flexible cord.

MouseMan® Cordless

TrackMan® Portable

TrackMan®

ORDER DIRECT FROM LOGITECH.

If you're already using a Logitech mouse, you can upgrade to our latest software for only $19 by calling **1-800-889-0029.**

From Logitech, the company that's made twice as many mice as the next guy.

Circle 130 on reader service card.

LOGITECH

The Senseware™ Company

*[illegible] independent test results. Plus [illegible] & [illegible] sales in Latin US & Canada. [illegible] Trademarks belong to their owners. [illegible]

for all output devices, from video displays to printers.

All Windows applications can use them. You don't have to install separate fonts for each application—saving you time and hard disk space.

Q ADDING FONTS

What's the best way to add and remove TrueType fonts from Windows 3.1?

A: Use Windows' Control Panel. To add fonts, run Control Panel and select the Fonts icon. Click on Add, and then choose the drive where the additional fonts are located. Select the fonts that you want to install or choose Select All, and click on OK. Windows then copies the selected font files to your hard drive and makes them available to all your Windows applications.

To remove fonts, highlight them, and click on the Remove button. Check the Delete Font File from Disk box if you want the actual fonts files to be cleared from your hard disk, or leave it unchecked if you want to reinstall the fonts more easily later. Finally, choose Yes or Yes to All to remove the fonts.

Q SCREEN FONTS

How does Windows 3.1 select a screen font for a selected printer font?

A: Windows' GDI finds and acts upon any installed font on your system, but if it doesn't find the right file, it uses a substitution technique that's called *font mapping*. A Windows application requests a font from Windows by name and other attributes. If the GDI can't find the font that it's looking for, the font mapper attempts to use a substitute TrueType font so that the characters look good at any point size.

The font mapper uses the other attributes the Windows application requests to substitute a font. For example, if a serif font is requested, the font mapper uses Times New Roman. If it's a sans serif font, Arial is drafted. Courier New is used to stand in for any fixed-pitch font. And for a script or decorative font, the font mapper chooses the best fit from its options.

If both a bit-mapped font and a TrueType font exist with the same name, such as Symbol, then the bit-mapped font is used at sizes for which bitmaps exist, and TrueType is used at all other sizes. To obtain TrueType in all cases, you can add the following setting to the [TrueType] section of your WIN.INI file:

```
TTifCollisions=1
```

SUPER TIP

Want a more readable system font for title bars, menus, and Notepad? Add a new line to WIN.INI, and you can make any font with the file extension .FON your system font. Open your WIN.INI file with Sysedit or another text editor, and anywhere in the [Windows] section, add the line SystemFont= followed by the name of any font with the .FON extension (such as SERIFE.FON, SMALLE.FON, or ROMAN.FON) in WIN.INI's [Fonts] section. Save your changes to WIN.INI, and restart Windows.

Q FONT LIMIT

How many TrueType fonts can I install before Windows cries uncle?

A: The number of TrueType fonts that can be installed in Windows 3.1 is limited to the number of fonts than can be used simultaneously during a Windows session. The GDI internal tables allow no more than 1,600 entries—this is more than even someone with bad taste can imagine using. There's one other limiting factor—the size of WIN.INI, which can't exceed 64K. Depending on the other elements in WIN.INI, this could limit you to between 500 and 1,000 fonts—still more than most people want.

Q DISABLE ATM

I want to disable Adobe Type Manager (ATM) on my system, but every time I load Windows ATM shows up. How can I get around this?

A: Like most third-party font programs, ATM ties into Windows by replacing the Windows System driver, SYSTEM.DRV, which loads from SYSTEM.INI. Here are the lines that ATM's installation routine changes, both of which are in SYSTEM.INI's [Boot] section:

```
SYSTEM.DRV=ATMSYS.DRV
ATM.SYSTEM.DRV=SYSTEM.DRV
```

To test Windows without the font manager, open SYSTEM.INI with a text editor and precede these two lines with semicolons to comment them out. Then add the following line to the [Boot] section:

```
SYSTEM.DRV=SYSTEM.DRV
```

The next time you load Windows, ATM won't appear onscreen. To reinstate ATM, simply reverse the changes to your SYSTEM.INI file.

Q NO TRUETYPE

I installed TrueType fonts on my system but none of them appears in my applications. Why?

A: Several things can cause this problem. Some applications that were written before Windows 3.1 was available don't support TrueType fonts. If the TrueType fonts appear in some applications but not in others, the problem lies with your application—call the publisher to see if the product has been updated to support TrueType.

Also check the Fonts icon in Control Panel and make sure the Enable TrueType Fonts option is selected. If it is, the fonts may be corrupted. Remove them using Control Panel's Fonts option, making sure to select the Remove Font File from Disk option. You can then reinstall the fonts from the original font floppies.

SOUNDS LIKE THUNDER

RUNS LIKE LIGHTNING

September 1993
466VL MAGNUM

January 26, 1993
466 MAGNUM

MULTIMEDIA DEFINED.

MICRON
SEMICONDUCTORS TO SYSTEMS

15 YEARS STRONG

Circle 253 on reader service card.

ELECTRIFYING

15" MAG LX1564 SVGA color monitor
1280NI .28mm

Diamond Viper VLB
graphics accelerator

7 expansion slots:
7 ISA, 2 VESA

66MHz 486DX2
256K 15ns cache

8MB RAM
245MB HD

MICRON 466VL
$2699
MAGNUM MPC

SoundBlaster 16
CD-quality audio

Dual floppy drive
3.5" and 5.25"

280ms dual speed
MPC CD-ROM drive

Optional Altec Lansing ACS 300
speaker system with subwoofer

intel inside

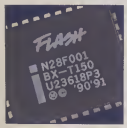
PENTIUM™ TECHNOLOGY READY

Standard on every Micron system is a Zero Insertion Force (ZIF) socket that makes upgrading to Intel's Pentium™ based OverDrive™ processors a snap! Heat's not a problem — Micron systems comply with Intel's stringent thermal dissipation guidelines.

DIAMOND VIPER ACCELERATOR

Powered by the Weitek P9000, the Viper VLB is up to 300% faster than the ATI Ultra Pro VLB. With 2MB of VRAM, you'll get 256 colors at 1280 x 1024 @ 74Hz and 16.7 million colors at 800 x 600. Turbo Windows and AutoCAD drivers included.

256K 15NS CACHE & FLASH BIOS



With 256K of ultra-fast Micron 15ns SRAM cache, your system's memory architecture will fully exploit future OverDrive processors. Plus, the upgradeable Flash BIOS lets you update your firmware from a floppy drive or modem.

VESA LOCAL BUS W/BLOCK MODE

With 2 VESA local bus slots and an integrated 32-bit local bus IDE interface, you can have up to 3 local bus devices including bus mastering cards. The integrated local bus IDE interface features Block Mode Transfer (BMT), which provides a 20-30% performance increase.

MULTIMEDIA FROM MICRON

PC WORLD BEST BUY
September 1993
486VL MAGNUM

PC MAGAZINE EDITORS' CHOICE
January 26, 1993
486 MAGNUM

MPC CD KNOWLEDGE PAK FOR WINDOWS

A $572 VALUE FOR JUST $49 WITH ANY SYSTEM PURCHASE!

Five hot multimedia titles that give you great sound and video:

- GROLIER'S MULTIMEDIA ENCYCLOPEDIA
- U.S. MULTIMEDIA ATLAS
- WORLD MULTIMEDIA ATLAS
- CHESSMASTER 3000 MULTIMEDIA
- MAVIS BEACON TEACHES TYPING

CHOOSE ONE AT NO CHARGE . . . OR GET ALL 4 FOR $199*

- WORDPERFECT FOR WINDOWS
- WORDPERFECT PRESENTATIONS
- PARADOX FOR WINDOWS
- QUATTRO PRO FOR WINDOWS

*With System Purchase Only. Not Available on ValueLine Systems

MICRON COMPUTER, INC.

800-223-6571

280MS CD-ROM DRIVE STANDARD

The competition makes you pay extra for what Micron includes as standard equipment on all systems. The MPC compliant 280ms CD-ROM drive supports multisession Kodak photo CDs and plays all standard audio CDs.

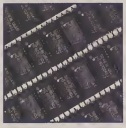
WINDOWS NT™ READY-TO-RUN

Microsoft's long-awaited Windows NT™ operating system is now available from Micron. The WinStation CD is available with Windows NT™ on CD-ROM and allows you to run all existing DOS and Windows applications while preparing you for tomorrow's 32-bit applications.

EPA ENERGY STAR COMPLIANT

Several Micron systems are available in configurations which are fully compliant with the EPA's Energy Star guidelines. These systems offer you the same Micron performance and value while saving you money through reduced power consumption.

MICRON MEANS MORE MEMORY



Over the past 15 years Micron has gained worldwide recognition as a leading memory manufacturer. Micron gives you the power you'll need for tomorrow's memory intensive applications today. We also have the 16MB, 32MB and 64MB upgrades you'll need—*at factory direct prices!*

Circle 254 on reader service card.

CD-ROM DRIVE

AND MORE MEMORY THAN EVER

425VL VALUELINE CD

- Intel™ 486SX 25MHz processor
- Pentium™ Technology Ready (ZIF)
- 4MB RAM, 120MB IDE HD
- Upgradeable cache (to 256K)
- 6 slots: 2 VESA, 6 ISA
- 280ms CD-ROM drive, 3.5" floppy
- Graphics accelerator (1MB)
- 14" MAG LX1450, 1024NI, .28mm
- Desktop "Tool Free" chassis
- Microsoft® Mouse, 101-key keyboard
- MS-DOS 6 & Windows™ 3.1 on CD

$1,299 LEASE - $47/MO.

433VL MAGNUM CD

- Intel 486DX 33MHz processor
- Pentium Technology Ready (ZIF)
- 8MB RAM, 340MB 14ms HD (VLB)
- 256K 15ns cache, Flash BIOS
- 7 Slots: 2 VESA, 7 ISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond SpeedStar Pro VLB (1MB)
- 14" MAG LX1450, 1024NI, .28mm
- Desktop "Tool Free" chassis
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$1,999 DX2 66MHz - ADD $200

466VL MAGNUM MPC

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 8MB RAM, 245MB 15ms HD (VLB)
- 256K 15ns cache, Flash BIOS
- SoundBlaster 16, dual floppy
- 280ms Dual Speed CD-ROM drive
- Diamond Viper VLB (1MB)
- 15" MAG LX1564, 1280NI, .28mm
- Desktop "Tool Free" chassis
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$2,699 LEASE - $98/MO.

466VL WINSTATION CD

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 16MB RAM, 340MB 14ms HD (VLB)
- 256K 15ns cache, Flash BIOS
- 7 slots: 2 VESA, 7 ISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond Viper VLB (2MB)
- 15" MAG LX1564, 1280NI, .28mm
- Desktop "Tool Free" chassis
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$2,799 LEASE - $102/MO.

466VL WINSTATION CD with WINDOWS NT™

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 16MB RAM, 256K 15ns cache
- 340MB 14ms SCSI 2 HD (VLB)
- 280ms CD-ROM Drive, 3.5" floppy
- Diamond Stealth Pro VLB (1MB)
- 15" MAG LX1564, 1280NI, .28mm
- Desktop "Tool Free" chassis
- Microsoft Mouse, 101-key keyboard
- Microsoft Windows NT™ on CD
- Choice of application software

$3,199 LEASE - $111/MO.

466VL POWERSTATION CD

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 16MB RAM, 256K 15ns cache
- 540MB 10ms HD, 4MB cache (VLB)
- 7 slots: 2 VESA, 7 ISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond Viper VLB (2MB)
- 17" MAG MX17F, 1280NI, .26mm
- Desktop "Tool Free" chassis
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$3,899 LEASE - $135/MO.

466VLE MAGSERVER CD

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 16MB RAM, 256K 15ns cache
- 1.2GB 10ms SCSI 2 HD (VLB)
- 8 slots: 2 VESA, 8 EISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond SpeedStar Pro VLB (1MB)
- 14" MAG LX1450, 1024NI, .28mm
- Tower chassis with 7 drive bays
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$3,799 LEASE - $132/MO.

466VLE WINDSERVER CD

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 16MB RAM, 256K 15ns cache
- 540MB 10ms SCSI 2 HD (VLB)
- 8 slots: 2 VESA, 8 EISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond Viper VLB (2MB)
- 15" MAG LX1564, 1280NI, .28mm
- Tower chassis with 7 drive bays
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$3,599 LEASE - $125/MO.

466VLE DESIGNSTATION CD

- Intel 486DX2 66MHz processor
- Pentium Technology Ready (ZIF)
- 32MB RAM, 256K 25ns cache
- 1.2GB 10ms SCSI 2 HD (VLB)
- 8 slots: 2 VESA, 8 EISA
- 280ms CD-ROM drive, 3.5" floppy
- Diamond Viper VLB (2MB)
- 17" MAG MX 17F, 1280NI, .26mm
- Tower chassis with 7 drive bays
- Microsoft Mouse, 101-key keyboard
- MS-DOS 6 & Windows 3.1 on CD
- Choice of application software

$5,399 LEASE - $187/MO.

CUSTOM CONFIGURATIONS WITHOUT CD-ROM DRIVES AVAILABLE: CALL FOR DETAILS!

Circle 255 on reader service card.

MICRON COMPUTER, INC.

800-223-6571

MON-FRI 7AM - 8PM, SAT 8AM - 5PM (MST) • 915 E. Karcher Road • Nampa, Idaho 83687 • (208) 465-3434 • FAX (208) 465-3424

means the difference

- NEXT DAY SHIPPING ON MOST SYSTEMS
- 30 DAY RISK-FREE MONEY BACK GUARANTEE
- ONE YEAR EXPRESS PARTS REPLACEMENT
- LIFETIME TOLL-FREE TECHNICAL SUPPORT
- ON-SITE SERVICE OR SYSTEM REPLACEMENT

intel inside

©1993 Micron Computer, Inc. All rights reserved. All prices and specifications subject to change without notice. Micron Computer, Inc. cannot be responsible for typesetting, errors in typography or photography. Intel, Intel Inside, Pentium and Overdrive are registered trademarks of the Intel Corporation. Microsoft is a registered trademark and Windows, Windows NT and the Windows logo are trademarks of Microsoft Corporation. The Energy Star emblem does not represent EPA endorsement of any product or service. All other company trademarks are trademarks of their respective owners. Prices do not include shipping or handling. 30 day risk-free money back guarantee does not include return freight or shipping and handling charges, applies only to Micron Inc. products, and begins from date of shipment. All returns require RMA numbers and must be shipped in the original container packed and insured.

OLE! You Can Tame the Cut-and-Paste Bull

Packaging objects, OLE 2.0, and OLE with DOS. BY RON WHITE

Ever feel like you're working for your software, and not the other way around?

You pull numbers from a database, for example, which you then have to extract into a spreadsheet, where they are incorporated into a graph. The graph needs some artistic embellishing, which requires a drawing program. The result is an illustration that changes in each issue of a monthly report that you create with your word processor. If only you could have one monster integrated program that would handle all the tasks your PC needs to perform with the ease and power of the best individual applications.

HIGHLIGHTS

- Use OLE with DOS apps.
- Link and embed objects.
- Understand OLE 2.0.
- Reestablish individual links.
- Customize links.

Actually, with most Windows applications you've already got it in the form of object linking and embedding (OLE). OLE makes it possible to take an illustration, text, a table, or other data created in one program and drop it into another—while still maintaining links to the original version of the data and to the program that created it. Many Windows applications already include OLE 1.0 capabilities, and OLE 2.0 is close behind.

OLE 1.0

OLE 1.0 provides two kinds of connections between an object in a file created by a *client application* and the *server application* that originated the data—or another file that contains the original version of the data. An object can be linked, embedded, or both.

Linked objects. A linked object maintains a connection between the data it displays and the original data in a file created by a different program. You set up the link so that when the original data changes, the data in the object is updated in one of two ways. You can choose to update the data automatically whenever you open the file, or you can set up the link so that it's updated only when you select the Update Link menu item.

Embedded objects. An embedded object is associated with the program that originally created the data in the object. But, unlike a linked object, an embedded object is not actually linked to a file that contains the original data. In fact, there may be no original file at all—the data may exist only in the client application. When you double-click on the object, however, Windows launches the object's server (native) application and opens the object file so that you can edit it using the program that created it.

PROS AND CONS

Both object linking and object embedding have advantages and disadvantages. The advantage to linking is that you get smaller file sizes than with embedding. This is because the link consists only of a path to the source file and a pointer to the linked data within the file. You can also make sure that multiple documents all contain the same updated information.

A disadvantage to linking is that if you move the source file from the path specified in the linked document, you must specify the new path to make the link current. If the source file is deleted, the information embedded in the client document that is linked to that source file can no longer be updated (though a visual representation of the information remains).

The advantage of embedding is that you do not need separate source files in order to pass information among documents or among members of your workgroup. Documents become totally self-sufficient. But files do get considerably larger when you embed information in them. In addition, information must be updated manually because it's not linked to a source file. You can get around this last limitation, however, by first creating an embedded object and then linking it—provided that the application that you're using supports this feature.

SUPER TIP While client and server applications must be on the same PC, an OLE 1.0 object does not have to be on the same PC as either the client or the server. This makes it possible on a network to make sure that each person using a link is getting the latest version of the data from the same file. Place the source file in a directory on the network server and link all the client documents on all the systems to it.

OLE 2.0

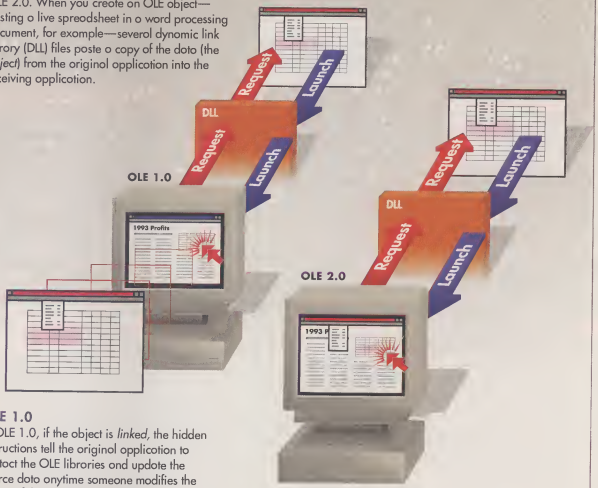
OLE 2.0 makes the Windows environment even more seamless than OLE 1.0. The most noticeable improvement in OLE 2.0 displays itself when you double-click on an embedded object. Instead of launching the entire server application, the menu and tools in the client application are temporarily replaced by those from the object's native application. This lets you, for example, edit a drawing embedded in a word processing document using the tools supplied by the original graphics application while still viewing the illustration within the context of the word processing document. This type of editing is called *visual editing* or *in-place editing*.

In addition, OLE 2.0 allows the creation of *subobjects*

OLE 1.0 AND OLE 2.0

The smarter objects are in Version 2.0.

Windows applications can support two kinds of object linking and embedding: OLE 1.0 and OLE 2.0. When you create an OLE object—pasting a live spreadsheet in a word processing document, for example—several dynamic link library (DLL) files paste a copy of the data (the *object*) from the original application into the receiving application.



OLE 1.0

In OLE 1.0, if the object is *linked*, the hidden instructions tell the original application to contact the OLE libraries and update the source data anytime someone modifies the object. If the object is *embedded*, when you double-click on it the hidden instructions launch the native application and send the object to it for editing. You can now edit the data using all the tools of its native application. When you save your changes, the server application closes and sends the object back to the client.

OLE 2.0

OLE 2.0 has important enhancements. When you double-click on an OLE 2.0 object, instead of launching the object's native application in its own window the DLL files replace the menus in the active application (called a *container* in OLE 2.0) with menus from the server—a process called *visual editing*. You can now edit the object with its native tools. Clicking outside the object restores the container application's own menus.

The New Generation Monitors

ViewSonic's New Generation is everything high performance monitors should be…and more.

The ViewSonic 15, 17, 20 and 21 produce remarkably crisp, sharp screen images with enhanced vibrant colors. Some advanced innovations include ergonomically designed drop-down digital control panels, special screen coatings, the ViewMatch™ color control system, and resolutions up to 1600 x 1280 non-interlaced.

The biggest surprise of all is the price—much less than you'd expect to pay for such astounding quality.

Call ViewSonic at **800-888-8583** for information on our award-winning monitors.

Welcome to the New Generation.

FEATURE SUMMARY

	ViewSonic 15	ViewSonic 17	ViewSonic 20	ViewSonic 21
Screen Size	15"	17"	20"	21"
Dot Pitch (mm)	0.27	0.27	0.28	0.25
Horizontal Frequency (KHz)	30-64	30-82	30-82	30-82
1600 x 1280 Non-Interlaced		■	■	■
Maximum Refresh Rate (Hz) at 1280 x 1024 Ni	60	76	76	76
Flat Square Screen	■	■		■
ViewMatch™ Color Control	■*	■	■	■
Low Radiation (MPRII)	■	■	■	■
Suggested List	$549	$1,299	$2,099	$2,399

Circle 150 on reader service card.

ViewSonic®

20480 Business Pkwy Walnut, CA 91789
Tel. (909) 869-7976 Fax (909) 869-7958

ViewSonic 21 screen image by SPATIEL TECHNOLOGY INC., Boulder, CO. Created with **ACIS®** Geometric Modeler and rendered with Visualization Plank

*Color temperature select 9300°K or 6500°K only

All products and brand names are registered trademarks of their respective companies

within other objects. This means you could have a word processing document include an embedded illustration created in a graphics program. The illustration, in turn, could have an embedded subobject, say, a graph created by a spreadsheet program. By double-clicking on any of the objects or subobjects, you get the menus and tools needed to modify that part of the illustration. For more details, see "OLE 1.0 and OLE 2.0" on page 216.

THE CATCH

As good as all the features of OLE 1.0 and 2.0 are, there's one major drawback: Not all Windows applications include them. Although Windows provides the tools that software creators need to make their programs use OLE, it's up to the individual application programmers to make their software OLE capable. Some do, some don't. Some give a program client but not server OLE abilities. And vice versa. It will take a while for a sizable number of programs to adopt the newer OLE 2.0 standard.

SUPER TIP Don't know if an application you want to link to is an OLE server? Find out by initiating a link. You will be presented with a dialog box that lists the types of objects that you can link to. From the names of the objects, you can often determine what OLE server they refer to. If it's not clear, however, look in the [Embedding] section of WIN.INI, which lists the names of the objects along with the pathnames and filenames of the programs with which they are associated.

Whenever you install an OLE server, part of the installation is for the program to add itself to the OLE registry (which is maintained in a file called REG.DAT) in WIN.INI. If the program you want to link to shows up, you're in business. If it doesn't, link to it using Windows' Object Packager utility.

Q OLE APPS

Is there a way I can get the benefits of OLE with a Windows application that was not designed as an OLE client?

A: While an OLE package can originate from any application that runs in Windows, it can be embedded only in applications that have been specifically designed as OLE clients. Consult your software vendor or documentation to determine if your applications are designed as OLE clients.

Q OLE IN DOS

Is there some way I can get the benefits of OLE with a DOS program?

A: Yes. With Windows 3.1, you can embed objects from applications that aren't designed as OLE servers—regardless of whether they're Windows or DOS applications. To do this you must use Object Packager, a utility supplied with Windows 3.1 in Program Manager's Accessories group. You use it to create a *package* that consists of an icon and a path to the server application and the original file. That package is then embedded in the client document using OLE.

A package behaves just like any other embedded object. When you double-click on the package icon, the Windows operating system starts the server application, which can display a chart, play a recording, or perform whatever function the application provides. Packages are useful for including whole documents inside other documents, which is helpful for including further help information on a topic and for inserting DOS command lines.

SUPER TIP You can link objects within the same application if the app is both an OLE server and a client. This can be helpful if, for example, you have several word processor templates or mail-merge documents that include the same return address, position title, part numbers, and so on. Instead of changing the information in each of the documents any time the information changes, create links to another word processing document that contains the information. Then when the data changes, you merely have to change it in the source file.

Q UPDATE LINK

How do I change a link so that it doesn't automatically update?

A: Use the Update Link menu item. It presents a dialog box that includes radio buttons to make a link automatic or manual.

Q OLE SUPPORT

My Windows word processor doesn't have OLE as any of the items on its menus. Does that mean it can't use OLE?

A: How a program implements OLE is up to the creators of that program. You may not see anything that says OLE. Instead, look for menu items such as Insert Object and Paste Link, often under the Edit menu. In the case of OLE 2.0, few applications yet support the new version since programs often have to be rewritten from the ground up to implement it.

Q INVALID LINK

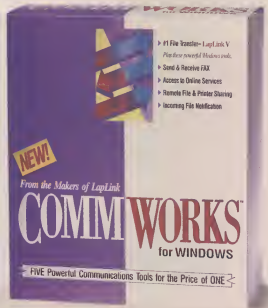
When I click an an embedded object, I get an error message: "Server failed to open document. Possible invalid link."

A: The most likely reason for any invalid-link message is that the file to which your document is linked has been either renamed or moved to a different directory.

To remedy the situation, look on the main menu under which you find your other linking tools. Click on the various options until you find one that's called Update Link or something similar. Using the Update Link option, you can reestablish the link to the file under its new name or path.

If It Were A Baseball Player, It Would Hit Home Runs, Toss No-Hitters, Steal Bases, And Sign For Under $200.

Okay, it hasn't happened in baseball. But in the computer world, there's a major league player in the communications game that can pretty much do it all. Introducing CommWorks™ for Windows™ by Traveling Software. The first complete communications package that gives you more flexibility than ever to do business away from the office. For starters, there's **LapLink® V,** the number one selling file transfer program. You can make unattended, regularly scheduled file transfers at anytime, from any place. And for local file transfers, use the included serial cable. CommWorks also allows you to send and receive a **Fax** from your PC quickly, easily and privately. CommWorks also features **Remote Access,** which brings remote files and printers directly to your PC wherever you are. And with the online program, you can tap into MCI Mail®, CompuServe®, or other **Online Services** at the click of a button. What's more, the CommWorks Control Center puts all these communications tools at your fingertips. See your local dealer or call Traveling Software direct for $50 off the introductory SRP of $199.95. And get the one who can do it all. Without the overblown salary



Introductory Offer
Call for $50 off
(800) 472-8649

Introductory offer good through Dec. 31, 1993 only. Offer valid when product purchased direct from Traveling Software. SRP $229.95. Introductory SRP good through Dec. 31, 1993. © 1993 Traveling Software, Inc. 18702 North Creek Parkway, Bothell, WA 98011, (206) 483-8088. CommWorks is a trademark and LapLink is a registered trademark of Traveling Software. Other products are trademarks or registered trademarks of their respective companies.

Circle 137 on reader service card.

You promised a new brochure. You promised it in color. You promised it by next Monday.

You've got to get it right the first time. PhotoStyler makes it happen.

They think it's easy. But you have to do it. And they're all watching—and waiting.

Whether it's a four-color brochure or a two-color flier, an annual report or an employee newsletter, the design for a new package or a quick ad for the local paper, you've got to make it work.

And no digital imaging software on the market today gives you more power, more capability, more flexibility than Aldus® PhotoStyler® 2.0.

And if you use Aldus PageMaker® 5.0, PhotoStyler can open up a whole new world of publishing possibilities.

In fact, PhotoStyler and PageMaker are the perfect desktop-publishing partners for the Windows environment. They take the complexity out of color. And give you the simplicity of stunning documents.

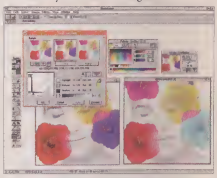
PhotoStyler 2.0 is the only digital imaging software to have the KODAK PRECISION Color Management System *fully integrated.* That means, for the first time, what you see is truly what you get. The system maintains color accuracy throughout the entire process, from scanned images to screen to proof to final printed output. It takes the guesswork out of any color job.

In fact, with PhotoStyler 2.0, you can be an expert in color without being a color expert. The expertise is in the box. So you get it right the first time.

Want to see what happens before you make it happen? PhotoStyler 2.0's Multi-Preview feature allows you to see the effect of changes before you apply them to the entire image. You save time, you save iterations, you save another headache.

The bottom line? Your bottom line. PhotoStyler 2.0 will simply make you more productive and more efficient (and, therefore, more appreciated).

So if you've been waiting to add color to your documents and publications, PhotoStyler 2.0 is what you've been waiting for.



So why wait? PhotoStyler 2.0 is at your local Aldus dealer *today.*

Or call us and we'll send you more information and a self-running demo disk so you can see for yourself how PhotoStyler and PageMaker can help you make a difference. **Call today toll-free (800) 685-3557.**

Free PhotoDisc™ in every package!
From the recognized leader in CD-ROM digital stock photography! A specially selected volume of 100 high-resolution photographs offering outstanding reproduction, plus over 1,000 other "thumbnail" images that you can use for browsing, experimenting, or positioning. You've seen similar discs in stores for $300—but it's yours ***absolutely free*** *from Aldus.*

ALDUS® PHOTOSTYLER®
Get it right the first time.

ALDUS Aldus Corporation 411 First Avenue South Seattle, WA 98104-2871 (206) 622-5500 fax (206) 343-3360

This ad was created with Aldus PhotoStyler 2.0 and Aldus PageMaker 5.0. ©1993 Aldus Corporation. All rights reserved. Aldus, the Aldus logo, and PageMaker are registered trademarks of Aldus Corporation. PhotoStyler is a registered trademark of U-Lead Systems, Inc. Windows is a trademark of Microsoft Corporation. KODAK PRECISION is a trademark of Eastman Kodak Company. PhotoDisc is a trademark of PhotoDisc, Inc. This offer applies only to full retail versions of Aldus PhotoStyler for Windows. Offer does not apply to not-for-resale, education, or trade-up offers for Aldus PhotoStyler. Offer good in the U.S. and Canada only and may not be combined with any other offer. Please allow four to six weeks for shipping. Offer void where prohibited by law. Offer expires November 5, 1993.

Are Graphics Display Problems in Your Face?

Banish screen flicker and bypass driver glitches. BY JAKE RICHTER

It's an all too common scenario: You install a new ultrafast, high-resolution, no-expense-spared video card, load Windows, and . . . *nada.* Instead of superfast, dazzling color, you're greeted with a blank screen. Alternatively, you get Windows to load, but the flickering, wavering screen you're presented with is unreadable. Video problems are in your face.

HIGHLIGHTS

- Select default drivers.
- Eliminate video flicker.
- Boost video speed.
- Correct memory conflicts.
- Isolate image problems.

Fortunately, they're also easy to resolve once you understand what goes on behind the scenes. A computer's video system is made up of three parts: the monitor, the graphics board (also called a video card or display adapter), and the video card's driver software. It's the video driver's job to tell Windows what kind of video signal the graphics board can receive, and it's the graphics card's job to send the image to the monitor, which in turn displays the image. To understand how each of these pieces works, you first have to understand how they interact.

GRAPHICS BOARDS

Graphics boards come in a huge array of flavors, ranging from plain-vanilla VGA cards that display a mere 640 by 480 pixels (the resolution used by most DOS applications) to ultrafast, high-resolution Windows accelerators that support resolutions of 1,024 by 768 pixels and higher. Generally speaking, three things distinguish graphics boards from one another: resolution, color, and speed.

Resolution. A graphics card's resolution (defined as the number of *pixels,* or dots, of light displayed horizontally and vertically onscreen) determines the amount and detail of information a monitor and a video card display. Virtually all video cards support standard VGA resolution, 640 by 480 pixels. Particularly on larger monitors, however, VGA resolution is barely adequate for Windows. Ideally, a video card should be able to handle resolutions of 800 by 600 pixels for 15-inch monitors and smaller, and 1,024 by 768 pixels (or better) for 17-inch and larger monitors. To display Windows at a particular resolution, the monitor and video card both have to support that resolution.

Color. The number of colors a video card can display also affects the onscreen image. Most video cards can display 16 or 256 colors, which is adequate for rendering menus and pie charts but makes some graphics seem grainy. To display photographs and other continuous-tone graphics, you need an adapter that handles 16-bit color (65,536 colors), or 24-bit color (16.7 million colors).

Speed. Drawing and redrawing Windows' graphical interface places a heavy demand on a system's CPU, and plain-old VGA cards quickly run out of gas when faced with Windows' array of colors, icons, and graphical menus. To take the burden off the CPU, many newer graphics cards called Windows accelerators include an onboard processor that handles some of the most basic graphics tasks locally. If Windows seems painfully slow to you, even on a 486, a Windows accelerator is a wise investment.

DRIVERS RUN THE SHOW

Every graphics board comes with its own set of drivers—software routines that tell Windows how to send information to the video card (see "How a Video Driver Works" on page 223 for details on how it accomplishes this). It's the driver that allows you to select the resolution and number of colors displayed. The driver also determines several other things, including the size and look of the fonts that are used for all menus and dialog boxes.

SUPER TIP A good way to determine whether your video card is suffering from a memory conflict is to try to load Windows in Standard mode (WIN /S). If it runs in Standard mode without a hitch but can't run in Enhanced mode (WIN or WIN /3), the problem is almost certainly a memory conflict. Check the video card's documentation for details on configuring it for another memory address.

You install the display driver by using Windows' Setup utility either in DOS mode (type SETUP from the DOS prompt in order to run it) or within Windows (click on the Windows Setup icon in the Main group). The latter option can be used only if the

video board is already properly installed and you want either to switch resolutions or to update the driver, while the former is a great technique for getting yourself out of a display problem if something won't load. In either case, you should select the Display option in Setup for a list of all the available drivers.

Windows comes with its own small collection of basic display drivers. While you can use one of these if it matches your current display adapter (or for troubleshooting—almost every video card will run with the standard VGA driver), you'll generally see better performance if you use the Windows driver written specifically for your card. If you're installing a video card for the first time and it comes with a set of disks, select the Other option, and Setup prompts you for the location of the new driver disk. You may also need to have your Windows disks handy since Setup might ask you for some additional files from them.

Occasionally, a video card manufacturer includes a utility on the driver floppies that gives you slightly more control over the video card than Setup does. You may, for example, be able to use the utility to select the number of colors displayed, the board's refresh rate, its active resolution, and other variables.

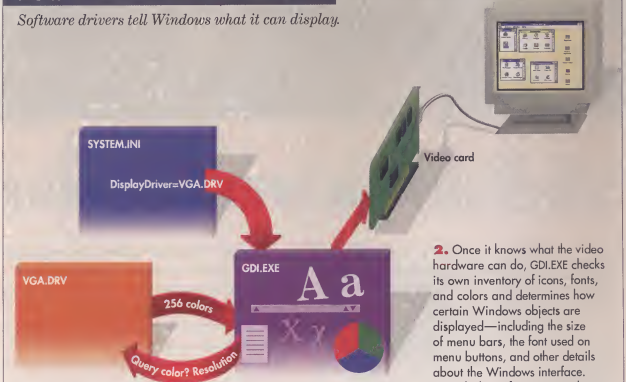
Q MONITOR FLICKER

I installed a new graphics board and the appropriate driver, and now my display has a horrible flicker. What's causing this and how do I fix it?

A: First, you need to verify that both the new board and your monitor can support the resolution you're trying to use in a noninterlaced mode. This information is usually found in the manuals for the board and the monitor. If they can both support the desired resolution in a noninterlaced mode, the problem most likely lies with your video card. Many video boards assume a default interlaced display at high resolutions and require you to run a special utility supplied with the board to force it into noninterlaced operation. In some cases, you need to run the utility only once, while in

HOW A VIDEO DRIVER WORKS

Software drivers tell Windows what it can display.



1. Each time you load Windows, it searches its SYSTEM.INI file for the DisplayDriver line and loads the display driver listed there. As the driver loads, Windows' GDI.EXE, the file responsible for the look of Windows' interface, queries the driver about the number of colors it can display, the resolutions it supports, and other details.

2. Once it knows what the video hardware can do, GDI.EXE checks its own inventory of icons, fonts, and colors and determines how certain Windows objects are displayed—including the size of menu bars, the font used on menu buttons, and other details about the Windows interface. It sends that information to the video card, which in turn displays it on the monitor.

Is this how you keep track

Regain control without the hassle.
If you're feeling overwhelmed by an endless stream of unfiled articles, reports, and folders, clear a path to your desk with PageKeeper™ from Caere.

PageKeeper is a whole new way to keep track of information that's on your desk, in your filing cabinets, and around the office. Simply use PageKeeper's built-in OCR to scan virtually any document into your PC, and PageKeeper reads and organizes it automatically. PageKeeper will even do the same for the information you already have stored on your hard disk.

Easy access to your accumulated information.
When it's time to do research for a report, locate a specific bit of information, or simply catch up on your reading, PageKeeper will have exactly what you're looking for on your screen in seconds. To find a document with PageKeeper, just type in some relevant words. PageKeeper will locate all the documents that could be of interest to you and automatically sort them in order of importance to your search. This unique search capability is called Weighted Relevance Retrieval,™ and it means that the most important information is always what you'll see first.

caere

Caere Corporation, 100 Cooper Court, Los Gatos, CA 95030

Caere is a registered trademark of Caere Corporation. The Caere logo, PageKeeper, Weighted Relevance Retrieval and Document Agent Series are trademarks of Caere Corporation ©1991. All rights reserved.

# of information on your desk?

Organize your desk, or the entire office. Use Personal PageKeeper to organize your own information. Or share your documents with co-workers over a network using PageKeeper. Either way, you'll manage information with incredible ease. For instance, you can fax out or e-mail documents. And when you're composing a letter, you can copy and paste text or graphics from any document in your database.

So get your information off your desk and start really putting it to use. For more information about Personal PageKeeper and PageKeeper, or for the number of your local dealer, **call 1-800-535-SCAN.**

PageKeeper's Document Agent Search *lets you use any document as an example or "agent" to find other documents with similar content.*

PAGEKEEPER

Circle 261 on reader service card.

others you may need to run it whenever you reboot the PC.

Another likely culprit behind your problem is a low video refresh rate. The term *refresh rate* refers to the speed at which a monitor and video card redraw the image onscreen. Ideally, you want a monitor and video card to support refresh rates of 72Hz or higher. Check the documentation to ensure that both support this refresh rate at the resolution you've selected. With many video cards, you can increase the refresh rate simply by switching to another video driver.

Q BLANK DISPLAY

I installed a new graphics board, and now my display goes blank and the system appears to hang when I run Windows. What causes this?

A: Either you've selected the wrong video driver or the video card is conflicting with another device in memory. If Windows refuses to load at all, you've selected the wrong video driver. If you can load Windows but it hangs unexpectedly, suspect a memory conflict.

Wrong video driver. The solution for this problem is simple: Reboot, run Windows Setup (located in the Windows directory) from DOS, and select the proper driver. Save your changes and then restart Windows—the problem should vanish.

Memory conflict. First, if you're using QEMM-386 as your memory manager, make sure that Stealth mode is turned off—this mode can be detected via the ST:M or ST:F switches on the QEMM command line in your CONFIG.SYS file. Stealth mode does a lot of things that some video boards can't deal with in graphics mode.

You may also have a memory overlap, where the memory manager is trying to load a program or driver into upper memory that's already spoken for, most frequently at address B0000H, which is where monochrome text mode runs. To exclude this memory from use by the memory manager, check the memory manager's documentation. For QEMM-386, place _X=B000-B7FF_ on the command line in CONFIG.SYS. If you're using HIMEM.SYS, read section 4 of the Windows 3.1 Readme file, or use a _EMMEXCLUDE=B000-B7FF_ statement in the [386Enh] section of your SYSTEM.INI file in the Windows directory.

SUPER TIP Manufacturers are always updating their video drivers to improve performance and fix glitches in earlier versions. Contact the maker of your video card for details on how to get the latest drivers.

Q CORRUPT COLORS

Why does my new graphics board corrupt all the onscreen colors?

A: Chances are you're trying to run your graphics board at a resolution it's not equipped to support, probably because there's not enough memory on the model. Check the manuals to see what resolutions and colors it supports. Check that your monitor supports the resolution as well.

Q SYSTEM HANGS

Whenever I do a certain thing in Windows, my system hangs or strange images appear onscreen.

A: Most likely it's your display driver. A good way to verify this is to rerun Windows Setup and configure it for the VGA driver supplied by Microsoft. Load Windows again, and perform the steps that caused the problem with the other driver. If it still happens, the problem is in the Windows application or Windows itself. If the problem disappears, call the video-card manufacturer for an updated driver.

Q DRIVER SETUP

What should I do if running Setup produces an abbreviated display driver list?

A: This usually means that some software has overwritten or corrupted the SETUP.INF file in your Windows directory. As of Windows 3.1, video card makers are supposed to supply their driver-setup information in a file called OEMxxxxx.INF instead of overwriting Windows' native SETUP.INF file. Unfortunately, not all manufacturers have adhered to this practice. To retrieve the original SETUP.INF for your system, copy it over from disk 1 of your Windows installation disks.

Q DEFAULT DRIVERS

What are Windows' default video drivers?

A: The default video drivers are determined in part by the hardware and network installed in your system. The default [Boot] section for SYSTEM.INI for VGA is:

```
386Grabber=VGA.3gr
286Grabber=VGAColor.2gr
DISPLAY.DRV=VGA.DRV
```

These values change when you install third-party drivers, which can cause problems for Windows. If the video adapter is VGA compatible, select Windows' default video driver by running Windows' Setup and choosing the VGA driver. Or edit SYSTEM.INI, placing a semicolon before the 386Grabber, 286Grabber, and DISPLAY.DRV lines and inserting the above lines. Restart Windows. If the problem disappears, it was the video driver.

SUPER TIP To get the best video performance possible from your graphics card, stick to the 256-color resolutions for applications that don't require lots of colors, such as spreadsheets and word processors. Rendering thousands of colors at high resolutions can slow even the fastest video cards to a crawl.

Jake Richter is chief technologist at Panacea, a computer graphics company in Londonderry, New Hampshire.

ONLY $349... (OR LESS)

Introducing DesignCAD for Windows

CAD Power With Windows Simplicity

IT'S NEW!
Meet DesignCAD for Windows, the powerful-but-affordable Computer-Aided Design package from the makers of the award-winning CAD software, DesignCAD.

DESIGNCAD EXCLUSIVES!
Finally, a CAD package that has a customizable toolbox, instant change editing boxes and a price that won't drain your budget. Now anyone can create their own professional quality CAD drawing thanks to the simplicity of DesignCAD's Graphical User Interface. Anything from backyard storage buildings to a NASA engineer's plans for a new space station, it's all within your grasp.

DESIGNCAD SAVES YOU TIME!
DesignCAD for Windows contains features such as full clipboard support for cutting and pasting graphic elements, multi-tasking for editing multiple DesignCAD drawings on the same screen and TrueType font support.

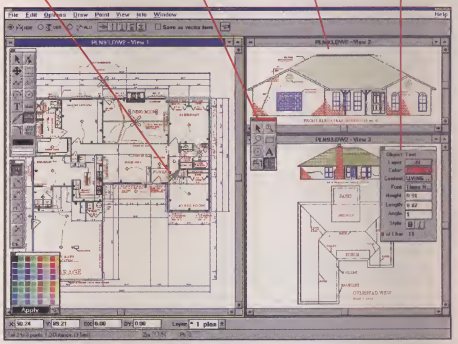
IT'S EASY!
With DesignCAD's short learning curve you can start designing immediately. Perfect for home, office or leisure. Your only limit is your imagination!

DesignCAD's Intelligent cursor changes to inform you of your editing options as you move across the screen.

"Hot Toolbox" allows you to create your own toolbox with your choice of tools for increased speed.

Regional zoom windows allow you to edit detailed areas of a drawing without having to zoom the whole drawing.

Instant-change edit box allows you to edit any attribute of an object with point-and-click simplicity.



December 17, 1991
DesignCAD 3D Vers 5.0

"Proving that a CAD package can let you draw a bank building without emptying your bank account."
—Byte Magazine

To receive your FREE Demo disk or simply to upgrade, call, write or fax

Phone (918)825-7555
Fax (918)825-6359

American Small Business Computers
One American Way,
Pryor, OK 74361

Circle 166 on reader service card.

Losing Data in Transfers? Get a Smart UART

The road to hassle-free, high-speed communications. BY DALE LEWALLEN

Hate to wait? Modems that blast data across phone lines at Mach 11 are now standard issue. But in an environment like Windows, where more than one application may be vying for time with the processor, high-speed communications can be . . . well, tricky. At transfer speeds of 9,600 bits per second and higher, PCs may not be able to keep up with data as it comes in over the phone lines, resulting in garbled data or dropped lines. To get around these problems, it's important to understand how Windows transfers data in the background. (See "Background Sending and Receiving" on page 230.)

HIGHLIGHTS

- Secure data transfers.
- Choose the right UART.
- Auto-dial from Cardfile.
- Tweak DOS connections.
- Print from Terminal.

INTERPRETING INTERRUPTS

When a modem receives data over a phone line, the data typically is routed to a PC through a serial port. Before the data actually enters the PC, however, it generates an interrupt—a message to the system's CPU that the serial port needs processor time. In Windows, where a communications program may be sending and receiving information in the background while running another application in the foreground, getting the processor's attention can be difficult or impossible. If the CPU can't get to the interrupt request fast enough, the next bit of data to come in across the phone lines overwrites the previous bit of information still waiting to be processed. You, in turn, lose data in the file you're receiving.

The faster the modem is, the more interrupts it generates and the harder your PC has to work to handle them. The time that it takes for an interrupt to be serviced by the CPU is called the *interrupt latency*. Even though each interrupt arrives and is processed quickly in the comparative span of "computer time," even a 486/50 can become overwhelmed trying to service interrupts. It can get so bad that the PC spends all of its time just servicing interrupts. Imagine the PC having to handle thousands of such interrupts per second, and you can begin to understand why communications under Windows is so complex. There is a better way.

SMART UARTS

Data arriving at a PC's serial port is handled by a chip called a universal asynchronous receiver-transmitter (UART). Older 16450 or 8250 UART chips can receive only one byte at a time—which means that if the CPU is tied up with a foreground application, the next incoming byte overwrites whatever data is in the UART's buffer. Newer serial ports that use a 16550 UART chip solve this problem, since they include a 16-byte buffer. This buffer acts as a holding trough for incoming information in cases in which the CPU is tied up during incoming communication.

Unfortunately, a surprising number of new computers don't include the new 16550 UART. To see if yours does, run the DOS MSD.EXE utility that comes with Windows (located in the Windows directory). Type MSD to run it at the DOS prompt. If your PC doesn't include this new chip, you can purchase add-in boards that buffer data flowing to and from a host PC so that your computer doesn't drop any characters. One option is Hayes Microcomputer Products' Enhanced Serial Port (ESP), a $299 add-in card that gives you two serial ports with the new UART chip. Some newer modems include their own 16550 UARTs as well. Adding one of these newer UARTs to your system is the most important thing that you can do to improve the reliability of your high-speed data transfers.

SUPER TIP For more efficient background communications under Windows, increase the values of the COMBoostTime and COMxBuffer values in your SYSTEM.INI file. Change the COMBoostTime parameter if the characters you type in from the keyboard fail to appear onscreen during a communications session.

Q PRINT ONLINE **I often use Windows' Terminal to log onto BBSes. Can I send the information it displays to the printer?**

A: Use the Printer Echo feature in Terminal's Settings menu. With the Printer Echo option enabled, all of the information displayed onscreen is captured in a buffer. The printer processes

COREL DRAW!

The Best in Graphics ...and more!

Get animated with CorelDRAW 4!

Create Dazzling Illustrations

PAGE LAYOUT
CHARTING
ILLUSTRATION
PHOTO-PAINT
TRACING/OCR
PRESENTATIONS
FILE MANAGEMENT
ANIMATION

CorelDRAW is renowned for its powerful graphics capabilities. CorelDRAW 4 now leaps even further ahead by adding page layouts, animation and OCR, as well as hundreds of other feature enhancements. It's the best value in software today–and it's still the easiest to use!

CorelDRAW 4 is the ideal desktop publishing tool! It includes illustration, charting, photo-editing, tracing/OCR and presentation capabilities...and so much more! There are advanced word processing features, multi-page layouts and dozens of artistic and special effects. It's packed with more fonts, more clipart images and symbols, more graphic tools and business applications. And now CorelDRAW 4 also includes CorelMOVE, a brand new animation module.

- **Comprehensive DTP Features**
- **Flexible Multi-Page Layouts**
- **Enhanced Word Processing**
- **Advanced Direct Scanning**
- **Powerful OCR (Optical Character Recognition)**
- **Single-Step Business Forms Tracing**
- **Thousands of Fractal Textures and Fills**
- **Dazzling Artistic Tools and Special Effects**
- **Convenient Spreadsheet and over 80 Chart Styles**
- **Object Data Management**
- **Over 5,000 "Drag and Drop" Symbols and Shapes**
- **Over 18,000 Clipart Images and Symbols**
- **Over 750 Fonts (650 Bitstream and ITC)**
- **Complete Color Separations**
- **On-line Help**
- **20 Photo-Paint Filters and 14 Image Correction Filters**
- **37 Import/Export Filters**
- **21 Transition Effects**
- **Over 200 Animated Flics**
- **Over 400 Cartoons**
- **Over 750 Actors, Props and Sounds**

18,000 CLIPART Images and Symbols

750 FONTS

ITC

ONLY $374.95 U.S. Funds

Registered User Upgrade $79.95
CorelDRAW 3 — Now Only $109.95!

ALSO INCLUDES TWO VALUE-PACKED CD-ROMs

–featuring a complete CD version of CorelDRAW 4 plus libraries of clipart images and symbols, fonts, animation elements, sound effects and a Video for Windows enhanced QuickTour.

Circle 209 on reader service card.

Since 1982 ComputAbility Consumer Electronics

Call Now!
1-800-554-1635

COREL (613) 772-6735

the data as soon as a complete page of information accumulates in the buffer. Terminal continues to print one page at a time as the buffer fills. The buffer captures and prints every line and command that is issued within the Terminal session.

Turning Printer Echo off sends anything left in the buffer to the printer automatically.

Q NEW APP

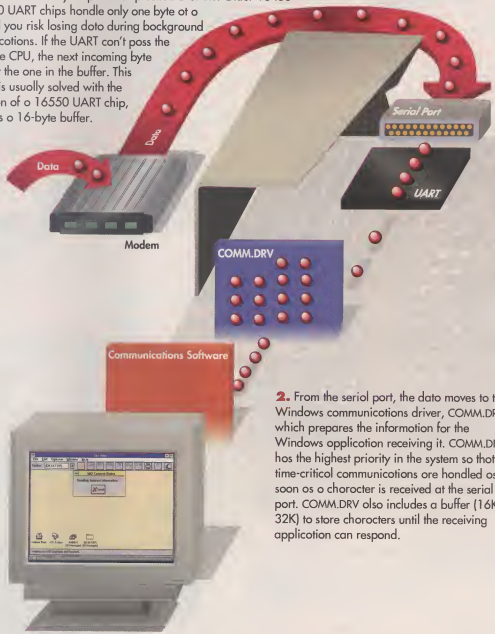
I'm about to add a third-party communications program. Will it make any changes to Windows ?

A: Some communications packages add their own drivers or update the drivers that come with Windows. Generally, this is not a problem. Difficulties can arise, however, if two separate communications

BACKGROUND SENDING AND RECEIVING

A smart UART and COMM.DRV's buffer save the data.

1. As data is received via a modem, it enters a PC through the serial port and is handled by a special chip called a UART. Older 16450 and 8250 UART chips handle only one byte at a time, and you risk losing data during background communications. If the UART can't pass the byte to the CPU, the next incoming byte wipes out the one in the buffer. This problem is usually solved with the installation of a 16550 UART chip, which has a 16-byte buffer.



2. From the serial port, the data moves to the Windows communications driver, COMM.DRV, which prepares the information for the Windows application receiving it. COMM.DRV has the highest priority in the system so that time-critical communications are handled as soon as a character is received at the serial port. COMM.DRV also includes a buffer (16K to 32K) to store characters until the receiving application can respond.

Are Your Natives Getting Restless Waiting For DOS/Windows Accounting?

Well, the waiting is over. Civilize your restless DOS and Windows™ users with Professional Series from SBT.

Pro Series is the *only* multi-user accounting software that works on both DOS and Windows workstations at the same time. So your whole tribe can migrate to Windows together, or one user at a time. In total safety. Starting today.

That's because Professional Series is written in Microsoft's® powerful FoxPro® database language. With Pro Series, you're getting in on the ground floor of the Windows revolution and the move from minicomputer to PC-based networks.

So if your natives are restless, give them what they want: Power, flexibility and true DOS/Windows multi-user accounting, backed by the partnership of SBT and Microsoft. Give them Professional Series and discover a whole new world of opportunity.

See For Yourself! Free Demo Disk!
Call Today! 800/944-1000

SBT Accounting Systems

Professional Series is a trademark of SBT Corporation One Harbor Drive, Sausalito, CA 94965, 415/331-9900 All brand and product names are trademarks of their respective holders. Photo "Ceremonial Dancing New Guinea" by Danny Lehman. © Copyright 1993

Circle 202 on reader service card.

packages try to update the same driver. It's also possible to inadvertently "backdate" a communications driver. In some cases, the supposedly updated driver included with the communications software is older than the existing driver. The drivers that are generally changed are COMM.DRV and *VCD. The *VCD driver is commonly replaced by VCD.386. This driver is referenced in the SYSTEM.INI file in the [386Enh] section. The COMM.DRV file is referenced in the SYSTEM.INI file in the [Boot] section.

You can often solve problems with communications packages by checking these lines and modifying them to their original settings: The original settings are COMM.DRV=COMM.DRV in the [Boot] section and Device=*VCD in the [386Enh] section of SYSTEM.INI.

Q PORT IN USE

I am getting a "Port in use" error message. What does it mean?

A: This error message means that some other application has taken control of the port you're trying to use for communications. The way around this error is to tell the other application to release control of the port. Alternatively, a device driver or a TSR loaded prior to starting Windows may be actively using the port. Close down any other application that might be using a communications port so that you can assign this port to the program you are trying to run.

SUPER TIP Still losing data during high-speed transmissions? Set the COM buffer to a larger size. Open SYSTEM.INI with an ASCII text editor or Windows' Sysedit and look in the [386Enh] section for the line

COMxBuffer=*size*

where *x* is the communications port and size is the port buffer size. The default setting for this buffer is 128—increase it to 256 and see if communications reliability increases. Increasing this value might slow down communications a bit, but you'll make up for it with greater reliability.

Q 16550 UART

How should I optimize Windows for use with a 16550 UART chip?

A: A 16550 UART chip regulates all data transfer in and out of the computer's serial ports. If the external modem can transmit faster than 9,600 bits per second, a 16550 or 16450 UART chip is required for reliable data transfer at this high speed. Internal modems that can communicate at high speeds come equipped with this chip. There are several possible settings in relation to the 16550 UART chip. By design, Windows checks for a high-speed UART port when the program starts, so most switches are not needed. If the modem loses some characters at high speeds, set the XOn/XOff protocol for the port. To set the protocol, open your SYSTEM.INI file with an ASCII text editor. The setting for the port protocol is in the [386Enh] section. Add the line

COMxProtocol=XOff

where *x* is the number of the COM port.

SUPER TIP Running out of communications ports? Windows 3.1 supports COM1 through COM4 by default, but you can add support for more by adding the line

MaxCOMPort=*x*

to the [386Enh] section of your SYSTEM.INI file (*x* represents the number of COM ports in your PC).

Q CARDFILE DIALING

Is there some way to have Cardfile automatically dial my modem?

A: It's easy to dial your phone numbers from Cardfile if you have a Hayes-compatible modem. First, select the card that contains the number you want to dial. Next, from the Card menu, click on Auto-Dial (or press F5). Cardfile displays the first number it finds. If you must dial a prefix before the phone number, click on the Use Prefix box and change the prefix if necessary. If you haven't set up the modem, click on the Setup button and make the appropriate changes to the modem options. Finally, click on OK to dial the phone.

Q DOS COMM

I use Windows for almost everything else, but my favorite communications package is a DOS application. Can I run communications in the background?

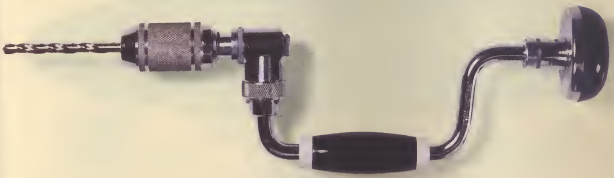
A: To run a DOS-based communications program in the background under Windows, you need to create a program information file (PIF) for that program using the Windows PIF Editor. Open the PIF Editor (usually found in the Accessories group), and open the PIF for your communications program. (See "Using DOS Under Windows? Learn to Love the Prompt" on page 259 for more on setting up PIFs). Make sure the Background Execution option box is checked.

If you get errors while running the DOS program in the background, increase the program's execution priority and check the Lock Application Memory box in its PIF settings. Running the application as a minimized icon during data transfers can also improve its reliability.

Another tip for improving data transfer: Minimize the DOS application during sessions.

SUPER TIP Before installing a communications program, make backup copies of both your WIN.INI and SYSTEM.INI files so that you can replace them if the third-party communications program changes an existing driver or installs a new driver that conflicts with your system.

WinFax Pro should be scared to bits,



because FaxWorks Pro is faster.

Introducing FaxWorks Pro 3.0. A faster and more productive way to manage faxes from your PC.

For starters, FaxWorks' unique Modem Diagnostics instantly identifies and configures your fax modem, so you're up and running immediately.

Convert faxes to editable text with OCR. Rotate and zoom at blazing speed. And instantly enhance any document for crystal clarity.

FaxWorks Pro has faster image manipulation. And that means you work faster. Drag and drop thumbnails to easily assemble faxes. Add notes using the unique floating toolbox. Use Cover Sheet Creator to add logos, clip art and even your own signature to professional looking cover sheets. You can even create faxes with documents from different applications, without leaving the program.

And with FaxTracker,® the premier fax management tool, you can manage all your faxes quickly and efficiently from one window. Search and retrieve by extended name, keyword or send/receive logs. File, compress and assemble faxes. And use MiniView to inspect fax documents without opening them.

It's no wonder the competition is scared. FaxWorks Pro is pure power. At a price that's well within reach. And if you've already bought another brand by accident, we'll forgive you for only $49. Just call 1-800-FAXWORKS, or see your local dealer.

COMPETITIVE UPGRADE $49

(404) 984-8088. LAN, OS/2 and DOS versions also available.

SOFNET

Circle 246 on reader service card.

FaxWorks is a trademark and FaxTracker is a registered trademark of SofNet, Inc. All other products are trademarks or registered trademarks of their respective manufacturers

The BJC-600 Color Printer In Black And White.

At Canon*, we think that before you go out and buy a personal color printer for your home or small office, you should have all the facts in black and white. And have them right in front of you.

So, let's start with the quality of our print.

The new Canon BJC-600 prints 360 dpi for both brilliant color and crisp black and white output on plain paper. Other color printers print a mere 300 dpi.

We also use inks that are richer and more vibrant. And to eliminate cross-color bleeding on plain paper, our inks have been made to dry much faster than conventional inks.

Now, what's the graphics print-out speed like?

Faster than you'd expect from a personal color printer. That's because the new BJC-600 print head has 192 color nozzles, compared to as few as 48 on other personal color printers. And to further help speed it along, the BJC-600 is designed to print color in both directions across the entire page.

Okay, how about all the little hidden costs? Not here. The cost-per-page of the BJC-600 is a fraction of what you would normally pay for color printing.

Unlike most other color printers, the BJC-600 has 4 separate ink cartridges — one for each color. So when you run out of one color you don't have to replace all the others.

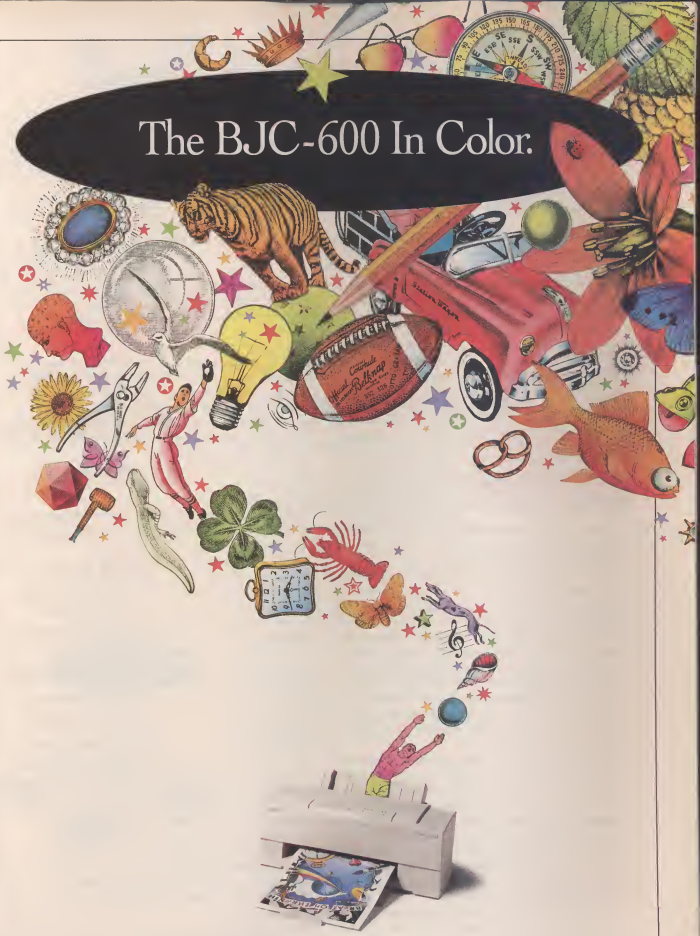
Finally, at less than $649*, the Canon BJC-600 color printer will save you money right from the start.

To get the name of your nearest Canon dealer, call 1-800-848-4123. Because now that you know the facts in black and white, it's time to see the BJC-600 in color.

Canon

*Dealer prices may vary, but most dealers sell the BJC-600 at prices under $649. © Canon Computer Systems, Inc. Canon and BJ are registered trademarks, and Bubble Jet is a trademark of Canon Inc. CCSI 2995 Redhill Ave., Costa Mesa, CA 92626. In Canada, call (800) 385-1211

The BJC-600 In Color.



The Three Mantras of a Network Zen Master

File Manager, Print Manager, and Control Panel. BY JOHN MONTGOMERY

So you want to be a Windows network guru. Hold on to your turban—you're in luck. Windows makes networking easy. Windows interacts with a network via File Manager, Print Manager, and Control Panel. Understand how these three utilities work, and you've got 90 percent of what it takes to be a network Zen master.

HIGHLIGHTS

- Resolve print errors.
- Increase file limits.
- List files properly.
- Change drive mappings.
- Boost performance.

GET CONNECTED

What do you do most often on a network? Access network disk drives and copy files. Most network operating systems (NOSes) provide extensions so that you can read and write to network disk drives with File Manager. After that, copying a file onto a network drive is just like copying it onto a local one.

Before you copy the file, however, you'll have to attach to the server and connect the drive. To do that, start File Manager and select Net Connections from the Disk menu. Select an unmapped drive letter from the drives list, then select Browse. You'll see all the servers on your network. When you select one, File Manager prompts you to log in. Presto—you've mapped a network drive.

Most NOSes also provide an extension to Windows that enables File Manager to access network disk drives in this manner. This extension, which is called a Winnet driver, is ultimately responsible for making Windows network aware.

When you copy the file using File Manager, another extension to Windows (the Windows network driver) takes care of redirecting the computer's copying instructions out to the network. The Windows network driver is responsible for dealing with the interaction of Windows' virtual machines and the network. It intercepts certain interrupt signals and checks to see if they're going out to the network. For NetWare 3.11, you'll see a file called VNETWARE.386 in this role. (See "How Network File Copying Works" on page 238.)

In addition to File Manager, you can access network resources through Print Manager. It works a lot like File Manager, except that instead of mapping network disk drives to drive letters, it maps network printers to your local LPT ports. Fire up Print Manager, and pull down the Options menu. There are two options here that let you connect to a network printer. The most straightforward is to select Network Connections. You'll see a dialog box that closely resembles File Manager's Net Connections dialog box. It works the same way: Just select an LPT port and a network printer, then click on Connect. If you don't like using Print Manager, you can also connect to network printers using the Printers option of Control Panel—it works about the same way. Click on the Connect button and select Network, and you're in business.

TOTAL CONTROL

File copying and printing aren't the only network features you can control from Windows. In Control Panel, you'll find a Network icon. Select it, and a dialog box pops up that allows you to perform actions such as disabling broadcast messages and boosting the number of print jobs you can view with Print Manager. Most important, from here you can change how Windows reacts when you change drive mappings from inside a DOS application window.

By default, if you map a drive while working in a DOS window, Windows ignores the changes. But, if you enable *handle sharing* (don't ask, it's just what they call it), any mapping change you make in a DOS window gets transferred to Windows and any other DOS windows that you're running. Normally, you want to keep handle sharing disabled because it can confuse Windows applications, but there may be times when you want to map a drive from a DOS window and have it immediately available to Windows.

SUPER TIP With many networks, you can save a bit of memory by lowering your NetHeapSize in the [386Enh] section of SYSTEM.INI from the default of 8K to 4K. NetHeapSize controls the amount of memory that Windows uses to transfer data over a network. Be careful, though, especially if you're using an Artisoft LANtastic network. The XCOPY command requires this value to be 128K.

You'd Be AMAZED At What Goes Into a UMAX® UC1260 Scanner.

If you're looking for a flatbed color scanner that can handle every serious graphics job you throw at it, get the new UMAX UC1260. You'll be astonished at how **BRILLIANT** it makes everything and everyone look.

Reproduce photographs with flawless **DETAIL.** Create **GRAPHICS** at the highest levels of resolution. Recognize text with ease. Subtle flesh tones reproduce with life-like **QUALITY.** Images literally pop off the page, while difficult contrasts come through with shining colors—even when enlarged.

The UC1260 offers unparalleled **VALUE** with the best line-up of features and the most attractive price available anywhere.

Like **1200 dpi*** for image quality found only with more expensive scanners. Single lamp, three-pass scanning with auto calibration that allows for maximum color accuracy and control. The ability to capture 16.8 million 24-bit colors, and 256 shades of gray for unlimited **COLOR** recognition. And built-in SCSI II for the high performance speed needed for high resolution graphics.

You can even get 2400 x 2400 dpi through software interpolation so even your most demanding image requirements can be met.

If you work on **MULTIPLE PLATFORMS** such as Macintosh,® Windows,® or UNIX,® no problem. The UC1260 is compatible with them all. And, Adobe® Photoshop** is bundled free with every unit.

Call us today to get more information on the new UC1260 or the name of the dealer nearest you. Once you get your hands on one, you'll be amazed at how great you look. Call toll free **1-800-201-UMAX (8629).**

Circle 172 on reader service card.

UMAX®

See Us At COMDEX—Sands #3019

Featuring our Enhanced Interface Software, optional Transparency Unit and optional Automatic Document Feeder.

*Maximum hardware resolution is 1200 x 600 dpi. Software interpolation used to boost resolution to 2400 x 2400 dpi. **Photoshop 2.5 bundled with Windows/PC and MAC versions. UNIX version bundled with Core Software

© 1993 UMAX Technologies, Inc. 3353 Gateway Blvd., Fremont, CA 94538 Tel: 510-651-8883 Fax 510-651-8834 UMAX is a registered trademark of UMAX Data Systems, Inc. "Maximize your image" is a trademark of UMAX Technologies, Inc. Other company names and product names are trademarks of their respective companies

Q FILE SERVERS

Why do I have problems running Windows applications from a file server?

A: Check to make sure that you are *not* running the DOS SHARE utility (it's often loaded via the AUTOEXEC.BAT file at startup). Current versions of the NetWare shell are not fully compatible with SHARE—this is most likely your problem.

Q NETWORK MESSAGE

Why doesn't my NetWare NWPOPUP.EXE utility initialize properly? When I exit Windows, I get all my messages.

A: Two possible causes: If you are running Windows in 386 Enhanced mode and a version of NetWare's NWPOPUP.EXE with a file date earlier than 3/10/92 is in your Windows directory, or if NWPOPUP.EXE is located in a directory that's prior to the Windows directory entry in the Path statement, then the NWPOPUP.EXE utility loads and fails to initialize properly under Windows 3.1.

Additionally, it may be necessary for you to place the following command line in the [386Enh] section of your SYSTEM.INI file:

```
TimerCriticalSection=10000
```

This setting increases the time (specified in milliseconds) before the critical section is timed out.

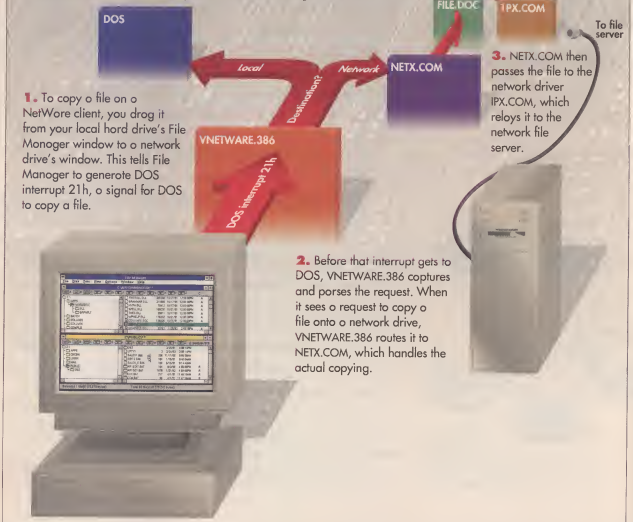
Q NETWORK PRINTER

Why do I get garbage output—such as incorrect fonts and garbled text—when I print to network printers?

A: Provided you're using the right printer driver, you probably need to run the NetWare PRINTCON utility and to set the Auto Endcap and Enable Timeout options to No.

HOW NETWORK FILE COPYING WORKS

VNETWARE.386 directs files to DOS or the file server.

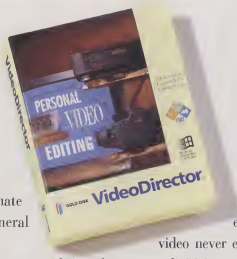


1. To copy a file on a NetWare client, you drag it from your local hard drive's File Manager window to a network drive's window. This tells File Manager to generate DOS interrupt 21h, a signal for DOS to copy a file.

2. Before that interrupt gets to DOS, VNETWARE.386 captures and parses the request. When it sees a request to copy a file onto a network drive, VNETWARE.386 routes it to NETX.COM, which handles the actual copying.

3. NETX.COM then passes the file to the network driver IPX.COM, which relays it to the network file server.

CUT THE CRAP.



Now you can easily eliminate bloopers, blunders and general boredom from your videos.

And instead, make great tapes with just the moments you want. In just the order you want.

All you need is your PC, camcorder, VCR, and VideoDirector:* the remarkable personal video editing program, from Gold Disk.

VideoDirector comes with everything you need to connect your PC, camcorder and VCR together into a complete video editing system. And since the video never enters your computer, no expensive digitizing cards are required.

With VideoDirector, you'll be editing great videos in no time. And for no more than **$199**.

So get a copy of VideoDirector today, or call us at **1-800-465-3375**. And start cutting.

Circle 148 on reader service card.

GOLD DISK

*Any LANC compatible camcorder (most Sony and other 8mm), any PC running Windows 3.1, 16mhz 386-SX or better, and any infrared controlled VCR will do.

© 1993 Gold Disk Inc. Gold Disk and VideoDirector are trademarks of Gold Disk Inc. Sony is a trademark of Sony Corp. Windows is a trademark of Microsoft.

SONY

Vertically Flat.

Look at the screen on a Sony Trinitron® monitor. See how little glare there is? How sharp the details are? That's because the screen is flat from top to bottom. Screens on ordinary monitors aren't, not even the "flat/square" ones And the difference shows.

Sony Trinitron monitors also have a Super Fine Pitch™ Aperture Grille for crisp text and bright images. Multiscan® technology for compatibility with most major graphics standards. And they're available in 14", 17", or 20" sizes.

So never settle for anything less than a Trinitron monitor from Sony. The ones with flat screens from top to bottom. For better images from edge to edge.

Call 1-800-352-7669 (ext. 103) anytime for more information by mail or fax.

© 1993 Sony Electronics Inc. Reproduction in whole or part without written permission is prohibited. All rights reserved. Sony, Multiscan, Super Fine Pitch and Trinitron are trademarks of Sony.

Circle 269 on reader service card.

Q MISSING SERVER

I'm running Microsoft Windows for Workgroups on a Novell Token-Ring network. Why am I getting the message "File server cannot be found"?

A: If you are running on a Novell Token-Ring network, you may be getting this message because ROUTE.COM is loaded in AUTOEXEC.BAT. Remove the line that loads ROUTE.COM. After you save the file, reboot your machine—the error message should vanish.

Q FILE LISTING

I sometimes have problems listing files and deleting directories. What am I doing wrong?

A: Nothing. NetWare file servers don't include the directory entries dot (.) and double dot (..) as DOS does. However, the NetWare shell (Version 3.01 or higher) can emulate these entries when applications attempt to list the files in a directory. Add the following command line to your SHELL.CFG file:

```
ShowDots=On
```

Turning on ShowDots causes problems with earlier versions of some 286-based NetWare utilities, such as BINDFIX.EXE and MAKEUSER.EXE. Make sure you upgrade these utilities if you upgrade your NetWare shell.

SUPER TIP

NetWare 3.11 volume names can get quite long, what with the server name, the disk drive name, and the directory name. To alleviate this mess, map a particular directory to appear as a root directory to Windows. Just add the word ROOT right after your MAP commands:

```
C:\ MAP ROOT F:=SERVER1\VOLUME2:DIR1\DIR2
```

Q 386 MODE

Some of the PCs in our company won't run Windows in 386 Enhanced mode when they're logged onto the Novell network. Why?

A: The three most likely problems (in this order) are outdated network drivers, two devices that are using the same interrupt, and two devices that are trying to use the same memory address. Here are steps you can take for each of these problems.

Outdated network drivers. Antiquated network drivers are more common than you might expect. The text file called NETWORKS.WRI, located in the Windows directory, provides information on determining which versions of your network drivers IPX and NETX are running and whether they need replacing.

Interrupt wars. The network card may be fighting for the same memory space as another device in your system. To eliminate an interrupt conflict, check to see if your network card is using IRQ 3 or IRQ 4; both are used by the serial ports. If it is, reconfigure the network card so that it uses IRQ 2 or IRQ 5, which are available on most PC systems.

Memory conflicts. If you suspect a memory conflict, first determine if your network card is using a range of memory between the 640K and 1,024K marks. If it is, exclude that range from the RAM that your memory manager can control. With DOS's own memory manager, EMM386.EXE, edit your CONFIG.SYS file by adding the following startup switch to the line beginning DEVICE=EMM386.EXE:

```
X=aaaa-bbbb
```

where *aaaa* is the beginning address of the range you want to exclude and *bbbb* is the end address of the range. Both numbers should be given in hexadecimal form.

Include the same range addresses in the following line in the [386Enh] section of the SYSTEM.INI file:

```
ExcludeHighRegion=aaaa-bbbb
```

SUPER TIP

If you're running NetWare 3.11 and using the XMSNETX driver (rather than the plain old NETX driver), you can give performance a quick lift. Just go into your SYSTEM.INI file, (located in the Windows directory), hop down to the [386Enh] section, and set OverlappedIO to On. This allows several virtual machines to make read and write requests to a disk before the first is completed.

Q SWAP FILE

Can I set up a Windows swap file on a network drive?

A: Yes, but we don't recommend it. If possible, set up the swap file on your local workstation's hard drive—you'll get better performance, and you won't risk losing the files you're working on should the network connection suddenly fail.

If for some reason you opt to set up a swap file on a network drive anyway, keep in mind that you can't set up a permanent swap file on the network—only a temporary one. You can also create one only on a network drive to which you have full privileges (including creation rights if you're on a Novell network). The swap file should also be set up in a private directory to which only you have read/write access.

Q DRIVE MAPPING

When I change drive mappings in Windows and exit, DOS doesn't know about my changes. Why?

A: If you're running Windows in 386 Enhanced mode, you can adjust the way Windows handles network drive mappings with the Network option in Control Panel. Normally, when you quit Windows, all changes you made are lost. If you deselect Restore Drives in NetWare's Device Driver Set, the mappings you made in Windows remain until you change them again.

If you're someone on the move

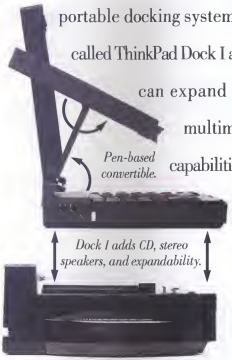
Not the same old dog and pony.

Not the same old song and dance.

show it.

as your needs change down the road.

Your ThinkPad 750 not only offers you multimedia on its own but has the advantage of adding a unique portable docking system. It's called ThinkPad Dock I and it can expand your multimedia capabilities by



adding CD ROM, full-motion video at 30 frames per second and stereophonic sound. When docked, your ThinkPad 750C and Dock I weigh only 12.4 lbs including their own built-in handle.

You've never had this much going for you in one concise package.

And with the Dock I or a port replicator, your ThinkPad becomes a desktop that knows no bounds. And if you happen to bump into a Tin Man in your travels and sell him some spare parts, the 750P quickly becomes pen-based with a swivel of your monitor. Get his signature and fax your order right in.

Backed by a 3-year international traveler's warranty,* and ThinkPad EasyServ,™** our convenient courier repair service. Part of the comprehensive service and support of IBM HelpWare.® For more information call the Personal Systems HelpCenter® day or night at 1 800 772-2227. To order, call toll-free 1 800 IBM-2YOU,*** or see your IBM authorized dealer.

ThinkPad 750

◆

486SL 33 MHz
10.4" TFT or 9.5" dual scan color or 9.5" mono display
TrackPoint II
170/340 HD (removable)
16-bit audio chip
PCMCIA Type III Release 2.01
4-20MB RAM
Parity memory
3.5" 2.88MB disk drive (removable)
Pen-based convertible
Up to 12 battery hours
4.9 lbs†-6.4 lbs
†(without floppy drive)
3-year int'l warranty

◆

The new ThinkPad 750 series. The power to move an audience. The tools to free you from your desk. It may just be everything you've been wishing for.

The ThinkPad 750C. The power to move you in stereo and living color.

There's no business like show business. Especially when it's your business appearing in stereo and living color.

Now the ThinkPad® 750 series is here to bring order, clarity and some much needed pizzazz to the workplace.

No more wrestling with heavy equipment. One system is now all you'll need for multimedia presentations.

And for the rest of your work the 750 (in TFT, dual scan or mono) is all you'll need, whether in the office or traveling down a yellow brick road. Or, if you're someone who believes there's no place like home.

Your presentations can really move at 30 frames per second in color and stereo sound.

The TrackPoint II™ pointing device leaves you mouse-free. Perfectly situated, your hands will never have to leave the keyboard. An integrated 16-bit audio chip allows you to add voice notation to your documents, "Nice work, Toto...I guess this means we're not in Kansas anymore."

TrackPoint II puts you in control with a fingertip.

Everything is designed to make your ThinkPad 750 more functional. Hard disks and floppy drives that are removable. Storage and memory you can tailor.

You can take full advantage of PCMCIA. A thin card that lets you connect into Ethernet, LANs, and add data fax/modems. And add a lot more

The ThinkPad Series. For people on the move.

ThinkPad 500

Quite possibly the handiest notebook around. At 3.8 lbs† it's the perfect size for a briefcase or boardroom. It packs a 486SLC2 50/25 MHz inside. Has a 85/170MB hard drive. Up to 12MB of RAM. You won't feel left out with the latest PCMCIA technology. And the TrackPoint II pointing device puts natural computing at a fingertip. Also comes with "Thank You's from ThinkPad," a savings book worth nearly $4,000.

Starting at: $1,999.††

ThinkPad 350C

The perfect notebook to get going on. Nothing gives you more features for your money. Color or mono display. Brilliant images. Handy at 5.2 lbs.‡ Inside it packs a 486SL 25 MHz. 125/250MB hard drive. PCMCIA flexibility will keep you well connected. Battery life lasts up to 9.3 hours.††† TrackPoint II's natural superiority keeps you in control with a fingertip. It also comes with "Thank You's from ThinkPad."

Starting at: $1,999.††

ThinkPad 710T

Inspired for closing deals on the road. You pen your order right on the screen. Customer signs. Thanks to PCMCIA capabilities, you fax the order instantly to your office. 486SLC/25 MHz processor drives print recognition so that it can read your pen strokes quickly and accurately. Its large 9.5" etched glass screen gives the familiar feel of writing on paper. It also comes with "Thank You's from ThinkPad."

Starting at: $2,999.††

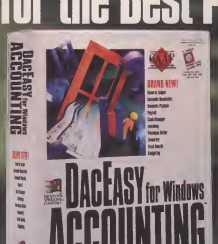
*For information regarding IBM's limited warranty, call 1 800 772-2227. Copies on request. International traveler's warranty service available in countries where ThinkPad is sold by IBM and IBM Business Partners. **ThinkPad EasyServ available in U.S. only. ***Available 8 am–12 am M–F, EDT, 8 am–7 pm Sat., EDT. †With battery. ‡Dealer prices may vary. ††Depending on usage and configuration. †Price reflects 350 mono. ††Thank You's from ThinkPad available in U.S. only, and valid 5/4/93–4/30/94. IBM, ThinkPad, HelpWare and HelpCenter are registered trademarks and ThinkPad EasyServ and TrackPoint II are trademarks of International Business Machines Corporation. © 1993 IBM Corp.

IBM®

Introducing...

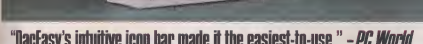
The Easiest New Windows Accounting, for the Best Price - Period!

NEW!
Brand New DacEasy Accounting and Payroll for Windows. Introductory price only $99.95. Save over 30%!



FREE!
The easiest Contact Manager is yours FREE when you try new DacEasy Accounting for Windows. A $50 value!

"DacEasy's intuitive icon bar made it the easiest-to-use." – *PC World*



What Makes It the Easiest?

There seems to be a lot of software that claims to be easy. But nothing stacks up to new DacEasy Accounting for Windows. Its incredibly simple interface lets you access practically any accounting function with the click of a mouse. And the paper look-a-like screens are familiar and straightforward. From tracking your inventory, to making invoices, purchase orders or just writing checks, DacEasy Accounting for Windows does it in seconds. Accounting just doesn't get easier than this. In fact, when reviewed by *PC World* against Peachtree for Windows 2.0, Microsoft Profit and BestBooks, the DacEasy interface was chosen as the easiest-to-use! Plus, it includes a powerful payroll system free! And best of all, if you call now, you can get DacEasy Accounting for Windows with Payroll for just $99.95 - that's 30% off the suggested retail price. When it comes to affordable Windows Accounting, only one is *really* the easiest – DacEasy.

Free Windows Software

Try New DacEasy Accounting for Windows, and get DacEasy Instant Rolodex for Windows **FREE**. It's a powerful stand-alone contact and activity manager that also integrates with DacEasy Accounting for Windows to help you keep track of contacts, to-do lists, appointments and more. It's a $50 value **FREE**!

For Less Sophisticated Windows Accounting Needs...

Try our other new Windows system, DacEasy Instant Accounting for Windows. It's designed specifically for service-based businesses with just the right features to make your business run smoothly! Don't bother with Quickbooks, BestBooks or any of those other "bookkeeping" programs that are more than twice the price. Try DacEasy Instant Accounting and become an instant accountant for only $39.95–that's 20% off the suggested retail price when you call now. Whichever DacEasy Windows system you choose, you'll soon discover why easy is part of our name.

DacEasy
The Inventors of Easy, Affordable Accounting!

Limited Time Offer.

Call DacEasy direct to order DacEasy Accounting for Windows with Payroll RISK FREE (60-day money-back guarantee) for just $99.95. You save over 30% and get DacEasy Instant Rolodex FREE. Or, visit your local reseller to buy DacEasy Accounting for Windows and send us a copy of your receipt to get your free software. Or, try Instant Accounting for just $39.95 - save 20%. Offer good through January 31, 1994.

Order Today!
Call DacEasy Direct at:
1-800-DAC-EASY
Offer valid in U.S. only. When ordering, use code PCC

* 60-day Money-back guarantee excludes shipping and handling. Limit one free Instant Rolodex per business. There is a $7.50 shipping and handling charge for the free software.
Discounts off of the MSRP are not available at retail locations and are not valid with any other offers. All product names are trademarks of their respective corporations.

All DacEasy products are trademarks of DacEasy, Inc. 7990 Preston Road, Suite 800, Dallas, TX 75252. Copyright © 1993, DacEasy, Inc. All rights reserved.

Circle 229 on reader service card.

Serenaded By Silence? Here's Sound Advice

Orchestrating audio files, CD-ROM drives, and more. BY FRED DAVIS

Let's get this straight: Multimedia isn't about getting your screen saver to sing or your spreadsheet to dance. It's about the combination of interactive hardware and software products that are making PCs a lot more interesting—and a lot more productive.

HIGHLIGHTS

- Jump-start a sound card.
- Evaluate sound-file quality.
- Play WAV and MID files.
- Configure a CD drive.
- Understand digital audio.

Most Windows multimedia applications require a system with a VGA display card that's capable of producing at least 256 colors—basically any video card you're likely to see in a PC today. The two other devices most people need in order to tap into the audio possibilities of Windows multimedia are a CD-ROM drive and a Windows sound card.

THINK CD-ROM

Multimedia is often associated with interactivity and CD-ROMs. *Interactivity* describes the exchange of information between the user and a program. Such interaction could be as simple as playing and rewinding an animated sequence and answering questions to a quiz or as complex as experiencing flight in a computerized simulation.

CD-ROM drives play a major role in the technology because much of the data used in multimedia, such as sound files and video sequences, requires acres of storage space. A single CD-ROM disc can store more than 500MB and thus provide an inexpensive way to distribute multimedia information. If you're buying a drive, look for one that's PhotoCD compatible, and remember, as with most things in computing, faster is better.

SINGING WINDOWS

The other major part of Windows multimedia—the far more complex part—is the audio portion. Windows allows you to use two forms of sound: digital audio and MIDI music. *Digital audio* lets you record speech, music, and other natural sounds. *MIDI music* incorporates a standard MIDI data format for recording, editing, and playing musical notes on electronic instruments—but it can be used for manipulating only musical notes, not recording actual sounds. Some cards, such as the Sound Blaster and the Spectrum 16, provide both digital audio and MIDI music capabilities, whereas others, such as the Microsoft Windows Sound System, provide only digital audio.

Digital audio is easy for most folks to understand because the technology has invaded consumer electronics in almost every product guise: CD, DAT, MiniDisc, and digital compact cassette. Digital audio in Windows works much like a sophisticated tape recorder, except that the sounds are stored in a file on your disk rather than on a tape. These are the most common file formats for digital audio files:

WAV The standard format used by Windows for digital audio files.Virtually all sound cards support it.

VOC The Sound Blaster format conversion utilities translate these files to WAV format for use in Windows.

AIF Audio Interchange Format, a cross-platform digital audio file format supported by Windows, Macintoshes, samplers, and other devices.

Windows includes a Sound Recorder utility, which lets you record, edit, and play back digital audio WAV files—provided you have the required sound hardware. The sound files you create can be embedded in or linked to applications that support object linking and embedding (OLE) and can be assigned to system events, such as Windows startup or exit.

SUPER TIP You can adjust the volume of sounds associated with system events by increasing or decreasing the volume in the Sound Recorder applet and then saving the file. The sound plays at the new volume from the Sound option in Control Panel.

MIDI IN A NUTSHELL

Understanding MIDI—as compared with digital audio—can require a real education. The Musical Instrument Digital Interface standard has been around since 1983, when manufacturers of electronic instruments developed it as a simple, low-cost technology for connecting various pieces of equipment, such as synthesizers, electronic music, keyboards, and computers.

With the right Windows music software and hardware,

Visio 2.0 is the easiest way to make great business drawings.

Now, it's also the easiest way to make a great business decision.

If you've used a stencil, you know how to use Visio. Visio stencils address virtually all your business drawing needs.

You're looking at some great drawings and diagrams made by a bunch of people who can't draw.

All were created with Visio,™ Shapeware's® award-winning drawing program for Windows™ 3.1 users.

Visio provides job-specific, on-screen stencils for easy access. So instead of drawing, you simply select SmartShapes™ from one of 20 stencils, and drag and drop them into place.

Unlike clip art, Visio's 600-plus SmartShapes have built-in intelligence. So they resize without distorting, connecting lines stay glued and integrated text makes labeling and editing a snap. You can even create and customize shapes of your own.

Visio's drag and drop SmartShapes take the "drawing"out of business drawing.

And since Visio supports OLE 2.0, you can easily integrate drawings with other Windows applications. Creating great business drawings has never been simpler.

For a limited time, buy Visio 2.0 for just $129.

Here's an easy business decision: Purchase Visio 2.0 by December 31, 1993, and save $170. Visio also comes with a 60-day, money-back guarantee. To order, for more information, or for the names of authorized Visio resellers near you, call toll-free:

1-800-446-3335, ext. CN9

Product Request?

SHAPE WARE

© Shapeware Corporation, 1993. All rights reserved. Outside the U.S. and Canada contact Shapeware by phone (503) 743-9533 or fax (503) 695-0555. Offer applies to versions for use in the U.S. and Canada only. Offer price in U.S. dollars. Shapeware is a registered trademark and Visio, Drag and Drop Drawing for Everyday Graphics, and SmartShapes are trademarks of Shapeware Corporation. Windows is a trademark of Microsoft Corporation.

Circle 186 on reader service card.

you can record, save, edit, and play MIDI files. Music software for PCs, Macintoshes, and most other systems supports a common data file format known as the Standard MIDI File format; on PCs, these files often have the extensions .SMF or .MID.

When you play a MIDI file, the computer sends MIDI the messages contained in the file to a MIDI instrument, which converts the messages into the sounds of a specific instrument, pitch, and duration. To acquire MIDI files, you can purchase preprogrammed MIDI music or record your own compositions. The MIDI Mapper utility that comes with Windows allows you to configure MIDI synthesizers and other devices to conform with either the Standard MIDI or MPC MIDI formats that work with Windows. Sound cards that support MIDI are typically more expensive than those that handle just digital audio. (For details, see "The Lowdown on Sound," below.)

Q NO CD-ROM

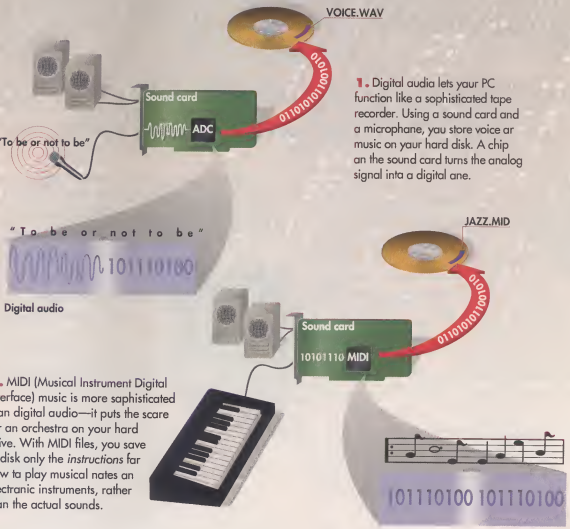
Windows doesn't want to recognize my CD-ROM drive. How do I get around this?

A: Windows needs no special device drivers or INI settings for CD-ROM drives. Get the drive running under DOS, and Windows should recognize it automatically. Suggestions for getting it online:

1. Make sure both of the required DOS drivers are loaded. You'll typically need to load a SCSI driver (or

THE LOWDOWN ON SOUND

Windows records and plays two types of sound: digital audio and MIDI music.



1. Digital audio lets your PC function like a sophisticated tape recorder. Using a sound card and a microphone, you store voice or music on your hard disk. A chip on the sound card turns the analog signal into a digital one.

2. MIDI (Musical Instrument Digital Interface) music is more sophisticated than digital audio—it puts the score for an orchestra on your hard drive. With MIDI files, you save to disk only the *instructions* for how to play musical notes on electronic instruments, rather than the actual sounds.

another disk drive driver) into your CONFIG.SYS file and a CD-ROM driver (usually MSCDEX.EXE) into your AUTOEXEC.BAT file. When troubleshooting your drive, do not load any of the drivers into the upper memory blocks (UMBs) with a memory manager.

2. Make sure you can access CD-ROM from Windows' Standard mode by starting Windows with the /S switch. This doesn't guarantee it will work in 386 Enhanced mode, but you should do it to verify that the hardware is functioning correctly.

Q NO SOUND

I just installed a new sound card. Why won't it work with Windows?

A: If the card isn't recognized or if your system freezes up, you may have an interrupt conflict. Use the Microsoft diagnostic program MSD.EXE (included with Windows and DOS 6.0) or a similar utility to investigate the status of the interrupts in your system.

Also, check the documentation to determine how to set the card for one of your unused interrupts. If all your interrupts are already used up, you have to remove something else to free one for the sound card.

If the card is recognized by your applications and its own utilities, it's probably OK. If that's the case, check your various cables, then check the audio output system. To check your audio output, just plug your headphones directly into the sound output port to see if it is sending out sound.

Q SILENT MIDI

My machine appears to be playing MIDI files in Microsoft's Media Player, but there's no sound.

A: Many popular sound cards, such as the Sound Blaster, the Sound Blaster Pro, and the Pro Audio Spectrum, come with an internal synthesizer and an external MIDI port. The Windows 3.1 MIDI Mapper utility lets you play MIDI sound files on one or both of these devices. If no external sound device (such as a synthesizer or drum machine) is connected to the

SUPER TIP

If your CD-ROM drive doesn't work, try to prevent Windows from using any upper memory space. Either start Windows with the /D:X switch or add the line

```
EmmExclude=A000-EFFF
```

to the [386Enh] section of SYSTEM.INI. If you are using EMM386.EXE or another memory manager, you must insert an Exclude statement when loading the memory manager. Otherwise, the settings for these memory managers override other memory-exclusion switches in Windows 3.1.

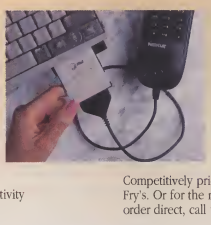
Links you anywhere, anytime!

New! PCMCIA KeepInTouch™ modem

Send/receive data and faxes at 14,400 bps from your PCMCIA portable computer via the cellular or standard telephone networks. Why tie yourself to a desk!

With AT&T's exclusive Enhanced Throughput Cellular (ETC™) protocol* and Optical Line Interface* (OLI™), you get:

- Fastest speeds possible
- Increased connectivity and productivity
- Reduced cellular and line charges



Plus, the KeepInTouch Card lets you easily download modem enhancements to protect your investment. It uses a software-defined architecture similar to that of our COMSPHERE® 3800 Modems that won these awards:

Competitively priced! Visit Computer City, Elek-Tek, and Fry's. Or for the name of the dealer nearest you, or to order direct, call us at **1 800 554-4996 ext. 48911**

AT&T

For End User Circle 210 on reader service card.
For Reseller Circle 211 on reader service card.

Visit us at Comdex Room #LN102

* Pat. Pending KeepInTouch, KeepInTouch Card, ETC, and OLI are trademarks of AT&T. © AT&T 1993

THE TYPEWRITER IS DEAD.

(In lieu of flowers, please send for the Smart Label Printer Brochure.)

New Labels: Color, Clear, Shipping, 3½" Disk and High Capacity Standard Labels

The Smart Label Printer Pro™ has spelled the end for typewriters in offices all over the world. Gone are the hassles of producing good-looking labels one at a time for envelopes, file folders, and name tags. The Pro prints fast, laser-quality output on a variety of labels sizes, incorporating text, photo-like graphics, even bar codes.

The Smart Label Printer Pro gets you organized in minutes and saves you hours. Its easy-to-use software works on Windows™ and DOS platforms, and lets you create personalized labels by varying fonts and layout.

What you see on screen is what you get on the label.

It's that easy.

To find out more about the Smart Label Printer Pro and other label printer models, call **1-800-688-0817.** And please, dispose of your typewriter thoughtfully.

SII
Seiko Instruments

Circle 262 on reader service card.

"SII" is a registered trademark of Seiko Instruments Inc. "Smart Label Printer Pro" is a trademark of Seiko Instruments USA Inc. Windows is a trademark of Microsoft Corporation. Specifications subject to change without notice. US Patent No.4,875,174. ©1992.

sound card's MIDI port and that port is selected in the MIDI Mapper, applications may appear to play MIDI files, but no sound is heard. Verify that the proper port name is selected in the MIDI Mapper Setup dialog box. If no external MIDI device is connected to the sound card's supplied port, select the appropriate driver for the internal MIDI Synthesizer.

Q WAV FILES

Why do I get the message "Cannot play the selected sound" with some WAV files but not with others?

A: Sometimes you'll get this message—or no message and no sound—when you play certain WAV files using the Sound section of Control Panel. That's because the Sound option plays only 22.05kHz WAV files—it won't play 11.025kHz WAV files. However, Sound Recorder plays both 11.025kHz and 22.05kHz WAV files and saves files only in 22.05kHz format.

To play the 11.025kHz WAV files, check the following:

First, make sure the sound functions are working by playing a sound from the Windows directory. If this does not work, you have driver or hardware problems—check your sound-card setup.

Otherwise, you can then load the WAV files into the Sound Recorder. Save them in 22.05kHz format so that you can play the file using Control Panel's Sound utility.

Q DOS GAMES

Why can't I use sound in some DOS games under Windows?

A: Many DOS applications support audio, but running them under Windows in 386 Enhanced mode sometimes generates error messages. This is because Windows takes over the audio hardware and doesn't relinquish control to a DOS application.

To hear the sounds from your DOS program, you can exit Windows and run the application from DOS, or run Windows in Standard mode—exit Windows and restart it by typing WIN /S.

SUPER TIP

As a guideline for evaluating the quality of sound files, 8-bit/11.025kHz sampling (recording) is roughly equivalent to AM radio quality. The 8-bit/stereo/22.05kHz sampling is comparable to FM radio quality, and the 16-bit/stereo/44.1kHz sampling provides quality equivalent to that found on audio compact discs. The quality of the digital sound depends on your sound card, the quality of the microphone or other sound source, the size of the sample (8 or 16 bits), and the sampling rate at which the sound is digitized.

Introducing the $139 investment no computer user can afford to be without...

"Don't take chances...Get the ultimate protection...Back-UPS from APC."

PC World Top 20 Upgrade

Blackouts, brownouts, sags... if you use computers, your bottom line is directly linked to your power line. The fact is, your data and hardware are vulnerable to problems that surge suppressors and power directors just aren't equipped to handle.

Call for your FREE 60 page PC power protection handbook!

Now there's an Uninterruptible Power Supply (UPS) to suit any budget. Back-UPS® are perfect protection for LAN servers, personal computers, phone/fax systems, POS equipment, or any other device that can go down when the power does. If lightning is a concern, Back-UPS are even backed by a $25,000 insurance policy against surge damage to your equipment (see details).

So don't wait for the inevitable power problem to rob your business. Protect your productivity with Back-UPS, available where quality computer products are sold.

APC Back-UPS provide instantaneous battery power during power disturbances, so your data and hardware are safe!

American Power Conversion

800-800-4APC, dept. C5

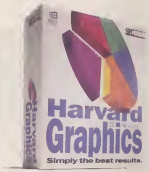
Businessweek's #1 Hot Growth Company!(NASDAQ:APCC)

Circle 116 on reader service card.

© 1993 Trademarks are property of their respective owners. *Expected list price.

The first presentation
more than moving tex

It's about moving people



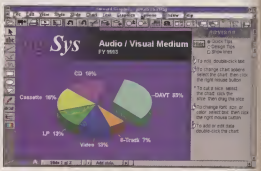
Harvard Graphics™ is about to change the world of presentations. Again. New Harvard Graphics 2.0 for Windows™ is the first presentation software focused on what comes after the meeting, not just what comes before.

Of course Harvard Graphics 2.0 for Windows is easy to use. In fact, it's easier to learn, easier to use and has more powerful features than any other presentation product you care to compare it to.

But ease of use, more features—that's not enough. Results are what really count. After all, what's the point of creating a presentation in 20 minutes if you lose your audience after 20 seconds?

With Harvard Graphics 2.0 for Windows, you'll get the results you want from every meeting, discussion, proposal and presentation.

The Harvard Graphics Advisor's Quick Tips (the vertical bar on the right) puts impact-increasing, action-inducing presentation tools within easy reach of your mouse. There's also a Five-Minute Coach available to speed you through the basics of creating better presentations.

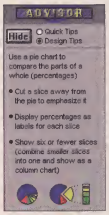


software that's about and changing charts.

and changing minds.

To help you get the best results, we've put a presentation expert inside the program. It's called The Harvard Graphics Advisor.™ The Advisor is an on-screen advice system to help make your bullet points more targeted, your pie charts more tasteful and your bar graphs more impactful. For more help, you can even call our Advisor hotline, where graphics experts are standing by.

The Advisor's Design Tips make it easy to give your presentations that fit-and-finish look, even if you aren't a graphic designer.



In no time, you'll have output that works harder for you, without having to work harder to get it.

We'll also help you sell your ideas in the meeting, with speaker notes, on-screen highlighting and stunning special effects. We can even help you conduct meetings over your network, with our exclusive Conferencing feature.

In short, Harvard Graphics 2.0 for Windows represents a new standard in presentation software. One that goes beyond ease of use to something far more important: results.

See your local reseller. Or call SPC now at ***1-800-336-8360, Oper. 960*** to order at our special upgrade price of $89 or to request a free demonstration disk. Also available on CD-ROM.

Harvard Graphics. Simply the best results.™

SPC SOFTWARE PUBLISHING

Upgrade your ability to get results for $89.

With Harvard Graphics 2.0 for Windows, every hour you spend creating presentations will be shorter. And every idea you present will be more compelling.

Simply put, Harvard Graphics 2.0 for Windows represents a new standard in presentations. With more than 100 new enhancements, it's easier to learn, easier to use and has more results-oriented features than any other presentation software you are currently using...even Harvard Graphics.

Here's a sample of what's new in Harvard Graphics 2.0 for Windows.

New ease-of-use features.

Advisor Quick Tips-*helps you create and enhance your presentations quickly.*

Quick Looks-*shows options to you graphically, before you implement them.*

Customizable Icon Bar-*makes your most used features easier to get to.*

New results-oriented features.

Advisor Design Tips-*expert assistance to help you create high-impact charts.*

Harvard FIX™-*lets you add attention-getting text and drawing effects to enhance your message.*

Conferencing-*lets you convene meetings over existing networks for as many as 64 participants.*

Upgrade $89*

See your local dealer or call 1-800-336-8360, Oper. 960.

*$89 upgrade offer expires 12/31/93. $125 thereafter (all prices in U.S. dollars). Shipping and handling extra. Upgrade eligibility requires you to prove ownership of one of the following: Harvard Graphics® (any version), Harvard Draw® Lotus Freelance Graphics,® Microsoft PowerPoint® (Windows only), HandsOnReport® Presentations, Aldus Persuasion® (Windows only) or CorelDRAW® (Windows only). All SPC standard license requirements and restrictions apply. Void where prohibited.

©Copyright 1993 Software Publishing Corporation. All rights reserved. Harvard, Harvard Draw, Harvard Graphics and the Software Publishing Corporation logo are registered trademarks; Harvard FIX and Harvard Graphics Advisor are trademarks of Software Publishing Corporation. Harvard Graphics is a product of Software Publishing Corporation and has no connection with Harvard University. **Windows is a trademark of Microsoft Corporation. Software Publishing Corporation acknowledges all trademarks and the rights of the trademarks owned by the companies referred to herein.

SPC SOFTWARE PUBLISHING

Using DOS Under Windows? Learn to Love the Prompt

Improve your DOS applications with custom PIFs. BY FRED DAVIS

Most Windows users would rather be audited by the IRS than run DOS apps under Windows. Unfortunately, sometimes there is no choice: Everyone occasionally has reason to visit the DOS prompt.

Here's the good news: Although DOS applications can't take advantage of Windows directly, they definitely improve when you run them under Windows. In fact, Windows 3.1 is already the most popular DOS shell ever. Windows taps the talents of 386 and higher processors to provide DOS apps with new powers, such as multitasking and the ability to integrate DOS and Windows applications. If you must run DOS apps, it's better to run them under Windows than from the sterile C: prompt.

HIGHLIGHTS

- Multitask DOS apps.
- Create custom PIFs.
- Free DOS memory.
- Resolve PIF errors.
- Speed DOS apps.

DOS-IN-A-BOX

In Windows' Standard mode (it should actually be called Substandard), DOS applications run in full-screen mode only, not inside a window. Although you can start several DOS applications when running in Standard mode, only one of the applications—the one you're currently working on—can run at a time. As soon as you switch away from one DOS application, it's deactivated, and it remains idle until you switch back to it.

In 386 Enhanced mode, on the other hand, Windows lets several DOS applications run simultaneously, even when you switch between applications. DOS applications can also run in an individual window that you can move, resize, and shrink to an icon.

386 Enhanced mode lets Windows tap a special feature of 386 and higher processors that lets it create a virtual DOS machine (VDM), a simulation of a complete PC with its own memory, hardware devices, and software configuration. By learning how to tweak program information files (PIFs), fiddle with INI files, and make clever use of batch files, you can run a variety of DOS applications that each perform as if they are in their own custom-configured PC.

Each custom VDM needs only the drivers and TSRs required by a single application, which leaves more of the precious 640K of conventional memory free for the program. And VDMs can take advantage of Windows enhancements such as SmartDrive and FastDisk—you may actually find that the performance of many DOS programs improves under Windows.

VIRTUAL DOS

To create a VDM, Windows needs a special PIF, which spells out how that virtual machine can use the actual system resources. Because a PIF is essential to prevent memory conflicts between DOS and Windows, Windows automatically supplies a default one if you don't. Every time you run a DOS program—which can be an EXE, COM, or BAT file—Windows searches your system for a PIF that has the same name (minus the extension) as the file you are attempting to run. If it doesn't find one, it uses the _DEFAULT.PIF file supplied with Windows. Although many DOS programs work well with the default PIF, you can often resolve compatibility problems and improve performance of the DOS application you plan to run in the VDM by learning to create and edit PIFs.

Each VDM inherits the state that your PC was in when you started Windows, including any device drivers or TSRs that were running. Because DOS programs have different system requirements, you often need to change the default PIF settings. To edit PIF files, Windows provides the PIF Editor utility, which lets you define a custom PIF with the settings required to run a particular DOS application. (For more details, see "How PIFs Work" on page 260.)

SUPER TIP To increase the rate at which Windows refreshes the screen for DOS applications running in a window, adjust the value of the WindowUpdateTime parameter in the [386Enh] section of SYSTEM.INI. The default value is 50, but to accelerate the refresh rate, set a higher value—anywhere from 100 to 200.

WINDOWS' PIF EDITOR

PIF Editor lets you set parameters that provide the DOS application with the system resources it needs to run and avoid conflicts with Windows. For instance, one application may require a serial port. Another application may need extended

memory or require a keystroke combination usually reserved for Windows. The PIF also provides Windows with information about how to manage multiple DOS programs in 386 Enhanced mode and lets you adjust settings that control each program's use of CPU time.

When you first install Windows, Setup creates a Program Manager icon called MS-DOS Prompt, which runs COMMAND.COM in full-screen mode using the file DOSPRMPT.PIF. When you start a DOS session from this icon, it takes up the entire screen, whether in Standard or 386 Enhanced mode.

A handy tip for creating a Program Manager icon that starts your DOS session in a window rather than full screen is to open DOSPRMPT.PIF using PIF Editor, click on the Windowed button under Display Usage, and use Save As to save the PIF under a different name, such as DOSINWIN.PIF. Create a program item icon for the new PIF and give it a different name, such as DOS-in-a-Box.

Q LOW RAM

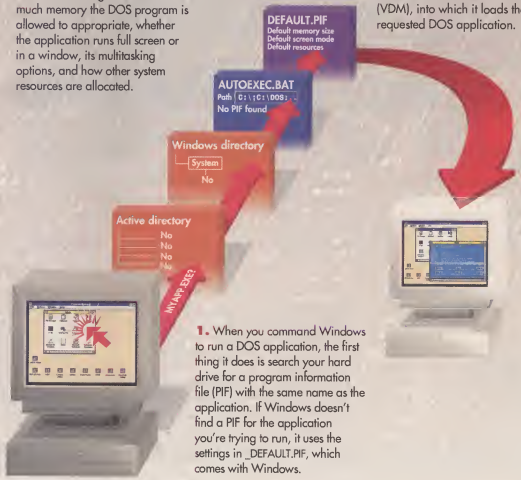
Windows displays an "Out of memory" message when I try to run more than one DOS program. What should I do?

A: You need to free up some memory. Here are some suggestions:

- Minimize any open applications.
- Turn off your desktop wallpaper using Control Panel.
- Increase the size of your permanent swap file

HOW PIFs WORK

They control memory and other resources.



Less Wait, Less Weight...

Large Built-In Trackball with "Click & Drag" No cables or clips to carry or forget.

Removable Hard Drive. Fast Service and Easy Expansion, not to mention security.

LCD Indicator Panel. Shows Battery Life, Hard Disk, PCMCIA, and keyboard activity.

SubNote

- *3.9 Lbs., only 7.1" x 10" x 1.5"!*
- *4Mb of RAM, exp. to 20Mb*
- *120Mb Removable Hard Disk Drive*
- *Nickel Metal Hydride Battery Pack*
- *Compact Charger.*
- *Pre-loaded with MS-DOS 6 and Windows™ 3.1*
- *79 key keyboard with "Inverted-T" cursor control*
- *PCMCIA Type II Slot*
- *User-Installable Fax/Modem & Memory Options*

	SubNote 486	ThinkPad 500	Omnibook 300
Full 32-bit Intel 486 CPU	YES	NO	NO
Hard Disk Size	120Mb	85Mb	40Mb (optional)
Backlit Screen	YES	YES	NO
External FDD	YES	YES	NO
LCD Status Panel	YES	NO	NO
DOS 6 and Windows™ Pre-Loaded	YES	NO	NO
Price	$1895. (4SX/33)	$1995.	$2195.

PC Computing BEST VALUE
PC Computing January, 1993
SlimNote® 4SX/25

PC Computing MINIMUM 200 RELIABILITY
PC Computing June, 1993
Slimnote® 4DX/33T

INFOWORLD INSURANCE
Infoworld December, 1992
SlimNote 4SX/25

EXPRESSCARE TWINHEAD

We back every SubNote with toll free technical support, an on-line BBS, and our unparalleled ExpressCare℠ Service. Give us a call today, and find out for yourself why a Twinhead SubNote should be your notebook.

intel inside

direct
800-995-8946

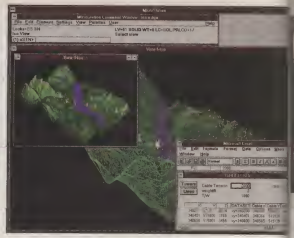
Twinhead

Twinhead Corporation
1537 Centre Pointe Drive Milpitas, CA 95035
Tel: (800) 995-8946 FAX: (408) 945-1080

Copyright ©, 1993 Twinhead Corporation, All Rights Reserved. All trademarks belong to their registered owners. SlimNote® is a registered trademark of Twinhead Corporation. ThinkPad is a trademark of International Business Machines. Omnibook is a trademark of Hewlett Packard Corporation. Pricing and configurations subject to change without notice. Pricing valid only on product purchased directly from Twinhead Corporation. The Intel Inside Logo is a trademark of Intel Corporation. Corporate Phone (408) 945-0808.

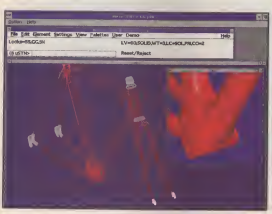
Circle 242 on reader service card.

Rendering. *Visualization and flythroughs – at your fingertips! MicroStation offers photo-realistic rendering to every designer, right in the software. It's easy to make your image reflect your imagination.*



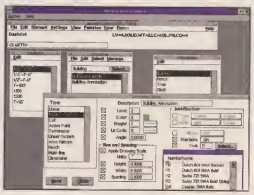
Windows. *It walks and talks Windows. Behind MicroSta lies the user-responsive programming you look for in good Win software. Version 5 gives you the ultimate in integration of CAD, engineering, and business applications.*

MORE POWER TO YOU.



Modeling. *Model any surface you can imagine in MicroStation. NURBS surface modeling combined with 3D Boolean operations gives you astounding flexibility in creating and modifying freeform models.*

Read & write AutoCAD .dwg



Workspaces. *Choose the design environment that matches your profession or your CAD expertise – even AutoCAD. Complete with custom interfaces, drafting styles, and design environment management. CAD has never been so streamlined!*

Drafting. *MicroStati gives you first-rate drafting – without the limitations of technology. Enjoy the advan of contemporary features lik ciative patterning/hatching, preview, standard text editin fonts, and context-sensitive Hypertext help.*

Intergraph® is a registered trademark of Intergraph Corporation. MicroStation® is a registered trademark of Bentley Systems Inc., an Intergraph affiliate. Other brands and product names are trademarks of their respective owners. Copyright 1995 Intergraph Corporation, Huntsville, AL 35894-0001. DDAD12LAO

Usability. *What does computer-aided drafting have to do with the way you think? Everything. MicroStation software works for you. It understands the drafting process so well that it infers what you'll do next.*

Power. *Take your pick of popular environments: DOS, Mac, Windows, Windows NT, or UNIX. Have a look at MicroStation on Intergraph's Technical Desktop Series personal workstations.*

Graphical User Interface. MicroStation's easy-to-use interface includes pull-down menus, dialog boxes, tear-off tool palettes, and tool settings window. Choose your interface – Windows or Motif – on any platform. *Transparent Modeless Operation.* The software supports the way you naturally work, maintaining command execution while you fine tune: change element attributes or command parameters, manipulate views, change the dimensioning system, and more. *Powerful View Manipulation.* MicroStation supports up to eight active views that can be moved, sized, and overlapped to fit your design. Zoom and area at any scale. Move around your design fast with built-in dynamic panning. *Workspace Editor.* Tailor pull-down menus, dialog boxes, and tool palettes – even disable commands – with a graphically oriented toolset for customizing your chosen interface. *Text Capabilities.* A convenient text editor lets you easily edit single-line or paragraph text. Choose from TrueType, PostScript, AutoCAD SHX, and MicroStation fonts. ASCII text files can be imported and exported. *Multiple Undo/Redo Commands.* Undo mistakes and perform "what-if" designs in a flash with unlimited undo and redo. *Plotting.* Plot raster and vector information by view or defined areas, at any scale. Visually preview the plot before plotting, saving time and materials. *Online HELP.* MicroStation's HELP remains active, tracking the command you're currently using, so there's no searching through manuals for assistance. *Associative Patterning and Hatching.* Associate patterning with graphics. Change graphics and the patterning updates. Flood-fill hatching/patterning intelligently fills an area, detecting boundaries and holes with a single pick. *Associative Dimensioning.* Dimensions are associated with the geometry, not with a point in space, so that when you change the geometry, the dimensions automatically update. *Custom Line Styles.* Create space-saving custom line styles and place railroad tracks, trees, isobars – anything – just as you would place a line. *Multi-lines.* Define line string elements comprising up to 16 parallel lines of varying symbology and store them in a style library for architects can use multi-lines for fast and easy placement and intersection cleanup of walls and partitions. *2D Boolean* Quickly modify, measure, and hatch multiple 2D shapes with integrated Boolean operations. *Mass Properties.* Calculate area and your model: surface area, volume, mass, centroid, moments and products of inertia, principal moments and directions, and radii of gyration. define relationships among graphic entities with intuitive drawing modes such as tangent, parallel, perpendicular, midpoint, intersection, and end-*Dimension-driven Symbols.* Based on established relationships, you can assign variables to dimensioned graphics and save the graphics as cells placement. Changes in dimensions automatically drive changes to graphics. Dimension-driven design saves valuable time in the design of families of

MicroStation Version 5 puts you in charge.

Call 800-345-4856 for a free brochure on MicroStation Version 5 and the name of an Intergraph representative in your area.

MicroStation

INTERGRAPH

Solutions for the Technical Desktop™

Circle 127 on reader service card.

(this is especially useful with FastDisk's 32-bit access).

• Remove unnecessary drivers and TSRs from your CONFIG.SYS and AUTOEXEC.BAT files.

• Load DOS and other drivers and programs into upper memory in your CONFIG.SYS and AUTOEXEC.BAT files. (Refer to "'Out of Memory' Error? Don't Believe It" on page 194 for details.)

• If you are running multiple DOS applications, configure some or all of them to run in the foreground only.

• Adjust the PIF settings for your DOS programs. Make sure that your memory-related settings don't specify more memory than a program actually needs to run.

• Run your DOS applications before running your Windows applications. Windows programs can configure themselves to run in a limited-memory environment; DOS programs cannot.

Q SLOW DOS

When I multitask DOS applications, everything slows to a snail's pace. What should I do?

A: Try these tricks:

• To speed up your applications, increase the ratio of time devoted to Windows in the foreground or background, depending on where your program is running. These settings are found under the 386 Enhanced icon in Control Panel.

SUPER TIP Try loading a "problem" DOS app first in a full-screen window, and you may be able to load your other programs subsequently. Clearing the Retain Video Memory and Lock Application Memory options from the PIFs of other programs will also release memory to the system.

• To speed up a DOS application's performance in the foreground or background, increase either the Foreground Priority value or the Background Priority value in the program's PIF. You can also modify this value on the fly by opening the application's Control menu and selecting the Settings item.

• Adjust the PIF settings for your DOS programs. Make sure that the Monitor Ports settings are all unchecked unless you really need them.

• Check to be sure that the configuration statement FileSysChange=Off appears in the [386Enh] section of your SYSTEM.INI file. This particular setting has the side effect of preventing Windows from updating an open File Manager window automatically, so you'll have to do it manually instead, by pressing F5.

Q NEW PIFs

I noticed that there are some PIFs already on my drive, but there aren't any on the Windows installation disks. Where do PIFs come from?

A: PIFs can be created automatically by Windows Setup, or they can be installed by the setup programs for DOS applications. To create a PIF with Setup, choose Setup Applications from Setup's Options menu. If you have a choice, use the PIF included with your application or provided by the software developer instead of the PIF created by Windows Setup. Some software makers place the PIF on the application disks but don't automatically install it with the DOS application, so check there first.

SUPER TIP The APPS.INF file in the Windows directory is a straight ASCII text file with the information that Windows Setup uses to create the PIFs for more than 200 DOS applications. You can inspect this file to see which applications are included and to determine which PIF settings will be used. You can even edit this file to add new applications or to change the PIF values for the applications it already lists—the APPS.INF file itself contains some remarks that will help you figure out how to hack the file.

If you find such a file, copy it to your main Windows directory or to the directory that stores the DOS application's files. If you don't find a PIF on the disks, contact the manufacturer. PIFs can often be downloaded from the developer's BBS or from a forum on an online service such as CompuServe.

Q MISSING PIFs

When I try to start a DOS program in File Manager, I get a "File not found" message although everything is there and I have a PIF set up for it. Why?

A: Look for multiple PIFs in the directory in which the program resides. For instance, WordPerfect 5.1 installs itself with a default PIF called WP.PIF, which specifies the program location as C:\WP51. If you've installed WordPerfect in a different directory or created a second PIF, File Manager still attempts to start WordPerfect using the default values for WP.PIF. Check all PIFs in the PIF Editor directory to make certain they contain correct drive and path information for the program and delete extraneous PIFs.

Q FLOPPY DRIVES

When I run my DOS program in an individual window, I can't access my floppy drives.

A: Try making the following change to the [386Enh] section of SYSTEM.INI:

```
[386Enh]
IRQ9Global=Yes
```

If this change doesn't solve the problem, try to disable the Monitor Ports option and set Video Memory to Text instead of High Graphics in the Advanced options for the application's PIF.

IBM

There was a time when your worst technical nightmare wouldn't go away till the morning after.

Aaron Matas
Product Support Specialist
IBM Personal Systems
HelpCenter

IBM Personal Systems HelpCenter® Product Support Specialist Aaron Matas knows from personal experience that emergencies don't keep bankers' hours. That's why our HelpCenter stays staffed and ready around the clock. So if a system goes down, you won't have to wait till sometime the next day to find out if it's your hardware, software, or who knows what. After all, it's just common sense that the company who sold you the system should be there for you when you need them. Whatever your question, experts like Aaron are wide awake and ready to help you get back in business. Fast. It's all part of IBM HelpWare®.

If you've ever bought computers "direct," we want you to know one important thing.

BM PC Direct

e're putting the personal personal computing.

This time, it can be different.

This time it's

L-R: Alice Robinson, Gregg McGhee, Jeff Herman and Beverly Whitman, Custom Build Technicians, IBM Personal Computer Corp

425SX/Si

Prices may be even lower! Call us today for the latest quote.

ValuePoint SpaceSaver

- Compact size: 14.2" W x 4.8" H x 16.5" D
- 3 slots (includes 1 VESA Local Bus slot) and 3 bays
- Also available in medialess (no drives) configuration to function as an economical LAN client workstation

ValuePoint Desktop

- Plenty of room to grow: 5 slots (includes 1 VESA Local Bus slot), 5 bays
- A super combination of speed, power, upgradability and expandability

ValuePoint Mini-Tower

- Convenient, compact Mini Tower processor case mea 9.5" W x 16.8" H x 16.9" D
- Enormous room for growt 8 slots (includes 1 VESA L Bus slot), 6 bays
- Perfect format for high-po computing (CAD/CAM, graphics, multimedia, etc as a low-cost network serv

ValuePoint Si – NEW!

- Newest entry-level member of the ValuePoint family
- Compact size: 14.2" W x 4.8" H x 16.5" D
- VESA Local Bus Video
- 3 slots and 3 bays
- Choice of IBM Keyboard (Basic[1] or Enhanced)
- A great, low-cost network client
- IBM HelpWare service and support

425SX/S

433DX/D

466DX2/T

IBM PC Direct

We're putting the personal in personal computing.

IBM

If you don't see it here, call us. We'll custom build a system just for you.

It's a personal commitment from Alice, Gregg, Jeff, Beverly and their associates at the IBM Personal Computer Company. Thousands of IBM people – many working around the clock – to keep you personally delighted with everything we do for you.

It starts – but doesn't end – with our hot-selling IBM ValuePoint™ PCs. Take a closer look at the systems shown here. Super PCs. Super prices. But if you don't see the system you want, call us. We'll build your PCs to your specifications – and your budget. We'll even preinstall selected software.

Remember, ValuePoint is backed by IBM HelpWare®, including our 30-day moneyback guarantee. No qualms. No quibbles. No questions asked.[1] And for one year with free around-the-clock telephone assistance and fast onsite service (even in the most remote locations!) from more than 10,000 IBM service representatives in over 1,600 locations nationwide.[2]

Call us today. And discover how we're putting the personal in personal computing.

intel inside

All ValuePoint SpaceSaver, Desktop and Mini-Tower systems listed below feature:[††]

- Intel® i486™ processors
- SVGA VESA Local Bus Video
- Upgradability via Intel OverDrive™ technology all the way up to Pentium™.[3]
- 101-key IBM Enhanced Keyboard and IBM Mouse
- Zero Insertion Force (ZIF) socket for fast, easy processor upgrades
- A 32-bit VESA Local Bus slot for local bus speed on SCSI drives and other peripherals
- IBM HelpWare

	ValuePoint Si – NEW!	ValuePoint SpaceSaver	ValuePoint Desktop	ValuePoint Mini-Tower
Features	**425SX/Si**	**425SX/S**	**425SX/D**	**433DX/T**
Processor	i486SX/25MHz	i486SX/25 MHz	i486SX/25 MHz	i486DX/33 MHz
Hard Drive/Memory	120MB/4MB	120MB/4MB	120MB/4MB	340MB/4MB
Drive(s)	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI
Operating System	IBM DOS & WINDOWS™	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$1,539** / $56 per month	**$1,649** / $60 per month	**$1,709** / $62 per month	**$2,489** / $90 per month
Features	**425SX/Si**	**433SX/S**	**433DX/D**	**466DX2/T**
Processor	i486SX/25 MHz	i486SX/33 MHz	i486DX/33 MHz	i486DX2/66 MHz
Hard Drive/Memory	212MB/4MB	120MB/4MB	120MB/4MB	527MB/4MB
Drive(s)	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 15V 15" SVGA FS NI
Operating System	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS	IBM DOS & WINDOWS
Price* / IBM Credit Lease**	**$1,699** / $61 per month	**$1,789** / $65 per month	**$2,059** / $75 per month	**$3,399** / $123 per month
Features	**433DX/Si**	**433DX/S**	**466DX2/D**	**466DX2/T**
Processor	i486DX/33 MHz	i486DX/33 MHz	i486DX2/66 MHz	i486DX2/66 MHz
Hard Drive/Memory	212MB/4MB	245MB/8MB	245MB/4MB	527MB/8MB
Drive(s)	3.5"	3.5"	3.5"	3.5"
Monitor	IBM 14V 14" SVGA NI	IBM 14V 14" SVGA NI	IBM 15V 15" SVGA FS NI	IBM 15V 15" SVGA FS NI
Operating System	IBM DOS & WINDOWS	OS/2®	IBM DOS & WINDOWS	OS/2
Price* / IBM Credit Lease**	**$2,049** / $74 per month	**$2,359** / $85 per month	**$2,729** / $98 per month	**$3,589** / $129 per month

ValuePoint Si systems do not include all features listed above chart. Please refer to product details listed at left, or call for more information. ValuePoint Si prices listed reflect IBM Basic Keyboard only. IBM Enhanced Keyboard available at additional cost.

Call 1 800 IBM-2YOU

refer to: HAC

1 800 426-2968
8am-midnight M-F, EST
8am-7pm Sat., EST
Purchase order is available for qualifying customers.

IBM®

Angela Hardy
PC Consultant
IBM PC Direct

It's as simple as calling Angela Hardy, or one of our other PC consultants. ValuePoint PCs, ThinkPad® notebooks, peripherals, printers, monitors, add-ons, the most popular software and more (IBM and non-IBM) are yours – at prices you'll find personally pleasing – when you call 1 800 IBM-2YOU. You speak to a PC consultant who'll either answer any question you have, or get you in touch with an expert who can. If you don't see it here, it's in our free catalog. And if it's not in the catalog, we can probably get it for you anyway. Either way...call!

This time you can have it all.

Save space inside your multimedia PC!

The Mwave™ Windsurfer™ Communications Adapter is the complete small business/home office solution! It's a data/fax modem, a telephone answering machine, a CD-quality sound system and MIDI synthesizer...all in one! Included are a V.32 Data Modem, 9600bps Fax/Modem, IBM PhoneFX™ for Windows, Mwave MIDI synthesizer with MIDI port, Trio DataFAX LITE for Windows...and more.

Mwave Windsurfer Communications Adapter
(92F4067) $349

Improve your communications and connectivity!

Whether you need to communicate with outside customers, satellite offices or the person next door, we offer a range of options for keeping you connected.

Boca Research™ 14.4/14.4 Data/Fax Modem, including FaxWorks™ (MM28202) $175

10Base-T ISA Ethernet® Adapter (60G0605). . . . $125

10Base-2 ISA Ethernet Adapter (60G0615). $139

IBM Token-Ring 16/4 AT Bus Adapter
(25F7367) $490

Super prices on popular software!

IBM PC Direct has the popular software you want, at prices you'll love. Remember, if you don't see it here, or in our catalogs, call us. Chances are we can get it for you fast!

WinFax™ Pro (MM13632). $79

STACKER® (MM29226). $95

Quicken™ for Windows 2.0 (MM45870) $45

WordPerfect® for Windows 5.2
3.5" (MM77090) $305
5.25" (MM80915). $305

Boost your processing performance.

Here's a super way to boost system performance without buying a new system. Our 256KB L2 Write Back Cache Memory Kit, Video Memory Upgrade Kits and Intel OverDrive Processor make it easy to upgrade your ValuePoint system. And we now offer L2 Cache Memory Kits for the ValuePoint SL too!

256KB L2 Write Back Cache Memory Kit
(60G1626) $249

256KB L2 Write Thru Cache Memory Kit
(60G1625) $229

128KB L2 Write Thru Cache Memory Kit
(60G1624) $119

1MB Video Memory Upgrade Kit (60G1623). $89

New! 256KB L2 Cache Memory Kit (73G3129). . . $60

New! 128KB L2 Cache Memory Kit (73G3128). . . $90

New! 512KB Video Memory Upgrade Kit
(73G3127) $42

New! 1MB Video Memory Upgrade Kit
(73G3134). $119

Intel OverDrive Processor 486DX25
(MM99983). $469

Give your PC gigantic storage capacity!

There are more options than ever for upgrading your current system. Replace your hard drive to keep up with tomorrow's demands, or add an additional diskette drive for increased flexibility...the choice is yours!

IBM 5.25" Internal, 1.2MB diskette drive
(32G3947) $99

340MB AT IDE Hard Drive (32G4196) $719

527MB AT IDE Hard Drive (32G4396) $1079

The easy, affordable way to go to a speedy CD-ROM.

The ISA Internal CD-ROM has a fast 300KB/SEC maximum data transfer rate – double the speed of most CD-ROM drives! You can load your operating system and applications software from a typical 600MB CD-ROM disk. You save precious hard drive space and load onto your ISA system faster. It's priced to move fast too!

IBM ISA Internal CD-ROM Drive (32G2961) . . . $315

FREE!

The IBM PC Direct™ Source Book.
ValuePoint, ThinkPad, peripherals, add-ons, popular software...it's all here and it's all yours for the asking. Call 1 800 IBM-2YOU today!

*IBM prices only. The offerings, prices and products are subject to change or withdrawal without prior notice. Products you acquire may not be counted under any existing Volume Purchase Agreement. The same offerings and products not available through IBM Authorized Remarketers. Remarketer prices may vary. Shipping and handling charges are extra.
**IBM Credit Lease prices are quoted for 36-month terms. Lease rates quoted are good through 11/30/93 after which time rates are subject to change without notice. Lease available to qualified commercial customers only. 1. Copies of warranty and 30-day money-back guarantee information available through IBM and IBM Authorized Dealers. Please call 1 800 426-2968 for details regarding IBM's money-back guarantee and limited warranty. 2. At no additional charge during warranty period. On-site service available Monday-Friday 8am-5pm in your time zone. APPLIES TO IBM DIRECT SALES ONLY. 3. Upgradable with Intel's future OverDrive processor based on Pentium technology. IBM, Help Center, HelpWare, ThinkPad and OS/2 are registered trademarks of IBM. ValuePoint, Mwave, PhoneFX and WindSurfer are trademarks of International Business Machines Corporation. All other brands or product names are registered trademarks, trademarks or service marks of their respective holders. PC Direct is a trademark of Ziff Communications Company and is used by IBM under license.
©1993 International Business Machines Corporation.

Call 1 800 IBM-2YOU
refer to: HAC
1 800 426-2968
8am-midnight M-F, EST
8am-7pm Sat , EST
Purchase order is available for qualifying customers.

IBM PC Direct

We're putting the personal in personal computing.

Only an Intel SatisFAXtion® Modem comes bundled with all this.

Intel's line of SatisFAXtion® Modems gives you the foremost in faxmodem technology—and the accolades of eight of the biggest industry publications—in every box.

In fact, the SatisFAXtion Modem/400 series has won more awards than any other faxmodem.

And for good reason. The SatisFAXtion Modem offers:

- An exclusive smart buffering feature, so all your data gets to you.
- Smart Line Sharing, a feature that distinguishes between voice, data and fax calls, so you only need one phone line.
- A separate microprocessor that lets you work in other applications while you fax—it's like having two computers.

WE MAKE COMPUTERS WORK HARDER.

Find out more. Dial ext. 284.
1-800-538-3373

- Free fax and data software for Windows* and DOS.

Call 1-800-538-3373, ext. 284 for your nearest dealer. Or for information via fax, call 1-800-525-3019, ext. 9793.

Then take home a SatisFAXtion Modem. And all the honors will go to you.

intel®

Circle 147 on reader service card.

©1993 Intel Corporation. *All products are trademarks of their respective companies.

OS/2 Fixes for Seamless Windows Junkies

Beware of the quirks of Win-OS/2 video drivers. BY RANDALL C. KENNEDY

What's one of the most civilized ways to run Windows and its applications? Believe it or not, it's OS/2. Whereas rickety old DOS often has a hard time juggling Windows' code, OS/2 can run multiple copies of Windows without even flinching. Besides, until 32-bit OS/2 applications begin to appear en masse, Windows applications will often be the only choice for people who use OS/2 as their primary operating environment.

HIGHLIGHTS

- Fine-tune separate sessions.
- Resolve DLL errors.
- Avert video conflicts.
- Establish OLE links.
- Run seamless Windows.

As of Version 2.0, OS/2 has been able to run Windows 3.1 applications as an integrated part of its environment. The mechanism that's responsible for this integration is called Win-OS/2. It's essentially a modified version of Windows 3.1. While Win-OS/2 itself operates in a relatively seamless fashion, there are several issues that affect OS/2's Windows support, including Win-OS/2's video drivers (or lack thereof), its support for object linking and embedding (OLE), and the overhead required by Windows applications running under OS/2.

AN INTRODUCTION TO WIN-OS/2

Win-OS/2 is IBM's solution to running Windows applications under OS/2 Versions 2.0 and 2.1. At the heart of Win-OS/2 2.1 is a modified copy of Windows 3.1 (Windows 3.0 for OS/2 2.0) that has been adapted to operate under OS/2's virtual DOS machine (VDM) support. Because Win-OS/2 is at heart a true Windows 3.1 environment, most Windows applications run without incident under Win-OS/2.

Even so, there are some subtle idiosyncrasies in the way that Win-OS/2 handles Windows applications. Some of these are merely cosmetic: Win-OS/2 can be configured to allow Windows applications to display "seamlessly" on the OS/2 Workplace Shell desktop so that they don't even appear to be Windows applications. Other issues are more significantly serious, like the way that Win-OS/2's separate sessions can drag on overall system performance.

THE VIDEO DRIVER PROBLEM

Win-OS/2's ability to run Windows applications seamlessly on the OS/2 WorkPlace Shell desktop (called *seamless Windows*) is tied directly to the quality of the OS/2 video drivers in use. All the bundled OS/2 video drivers that ship with OS/2 2.1, for example, fully support seamless Windows mode. However, third-party video drivers vary greatly from vendor to vendor in terms of both quality and features supported.

Many video card makers claim their drivers support seamless Windows, yet in practice the result is often buggy, erratic operation: Windows don't redraw properly and in extreme cases applications fail outright. Some third-party drivers don't support seamless Windows mode at all. So take care when you're inquiring about video driver support for a particular video card. When the talk shifts to Win-OS/2 support, be specific and demand full seamless Windows.

WIN-OS/2 SEPARATE SESSIONS

Other idiosyncrasies with OS/2 stem from the implementation of Win-OS/2 itself. To make applications more stable, IBM designed Win-OS/2 to run concurrently in multiple VDMs on the OS/2 desktop. This feature allows you to isolate Windows applications into their own, separate Win-OS/2 sessions; by doing so, it eliminates the instability that often plagues Windows users. Each separate Win-OS/2 session contains its own complete copy of Win-OS/2, and the failure of any single session thus leaves any other sessions unaffected. Only the application that was executing in the failed session is affected.

SUPER TIP Can't get your application into seamless Windows mode? Check with your video card maker about the latest version of the OS/2 driver for your particular video adapter. Vendors often correct problems with seamless Windows in subsequent driver releases.

Unfortunately, the idea of running multiple copies of Windows in separate VDMs looks good on paper but is something of a kludge in practice. For starters, each individual session requires

"ACT! WILL MAKE YOU MORE SUCCESSFUL IN 30 DAYS OR YOU DON'T PAY."

PATRICK SULLIVAN
VICE PRESIDENT AND GENERAL MANAGER
CONTACT MANAGEMENT DIVISION, SYMANTEC

THE BEST-SELLING SOFTWARE THAT'S CHANGING THE WAY THE WORLD DOES BUSINESS.

All over the world, people are joining the ACT! revolution. Piling up prospects. Doing two, even *three times* as much business as before. And astonishing their customers with a level of personal service they've never experienced.

For over half a million success-driven people, ACT! has already become a way of life!

THE PROVEN WAY TO FIND, KEEP AND SATISFY YOUR CUSTOMERS.

In the race for new customers, your competition is breathing down your neck. With ACT!, you'll leave them in the dust.

Pop-up reminders let you know exactly who you need to call and what you need to do at any time of day. You can easily stay on top of hundreds of leads, prospects and customers!

ACT! runs on PCs under both DOS and Windows, as well as on Macintoshes and HP 95LX palmtops. It's ideal for mobile professionals.

Want to send a thank-you note, or a bunch of prospect letters? Just use the built-in word processor with spell-checker, or select one of your pre-written form letters.

Then let ACT! fill in the names and addresses, and print the letters and envelopes. There's no need to type to keep in touch!

Your customers will be blown away by your impeccable, personal service. While you're on the phone, you'll have instant access to every detail about the person you've called — including past phone conversations and letters sent, schedules and "next steps." Even the little things — a spouse's name, or a favorite restaurant — that make people feel truly valued and ready to do business.

With ACT! in control of the details, you're free to concentrate on *profitable, business-building activities.* Customers report *doubling or tripling* their business volume with ACT!.

Need to change an appointment? ACT! is your comprehensive activity planner, too. Just "drag and drop" the meeting into its new time slot. Then print your revised daily, weekly or monthly calendar. You'll never forget another call, meeting or to-do!

You can also track and analyze your progress with a variety of reports, including prospect reports, activity reports, customer history reports and more.

WHAT THEY'RE SAYING ABOUT ACT!

"ACT! for Windows and my notebook computer are the ultimate sales combination."
Lon Orenstein
Computer Support Network

"I've tripled my business since I started using ACT!. It's a miracle."
John Rizzuti
Rizzuti Marketing and Media

"There's good reason for ACT!'s ongoing dominance of the contact management field. Both the DOS and Windows versions offer a comfortable balance of out-of-the-box usability and individual customization."
PC Magazine, Editors' Choice Award Winner, August 1993

PC MAGAZINE EDITORS' CHOICE

PC MAGAZINE 100 MOST ESSENTIAL PRODUCTS

MOBILE OFFICE MOST POWERFUL

FREE 30-DAY TRIAL!

Try ACT! free for 30 days. Simply pay the $9.75 shipping & handling charge with a major credit card. If you don't see *bottom-line results* within 30 days, just return it and you'll owe nothing more.

If ACT! boosts your success like we say it will, keep it—and pay a **limited-time price** of only $199 *(that's half the $399 suggested retail price)*. Don't let this extraordinary offer pass you by!

Call 1-800-628-4777 ext. AD04.

OR SEE YOUR SOFTWARE DEALER...
For a limited time, you can get a great deal through your software dealer, too. **Just call the number above to request your $50 rebate certificate.** (Free trial not available through dealers. Only major credit cards accepted.)

ACT!®
The Best-Selling Contact Manager
SYMANTEC.™

Rebate offer good on end user purchases of ACT! for Windows or ACT! for DOS between June 1, 1993 and December 15, 1993 from software resellers only. Valid product serial numbers and purchase signature must be present to receive rebate. Not applicable to duration, upgrade and other specially priced product. Not valid with any other promotion. Offer not available for resellers. Offer valid in the U.S.A. only. Prices listed in U.S. dollars. Limit one rebate or one special $199 offer per customer. Rebate not available on ACT! for Macintosh. ACT! for Macintosh suggested retail is $249.95. Tax, shipping and handling charges may apply. For complete information via fax, call 1-800-554-4403, select option #1 and request document #170 (ACT! for Windows), document #160 (ACT! for DOS), or document #180 (ACT! for Macintosh). The names of other products are trademarks or registered trademarks of their respective holders. ©1993 Symantec Corporation. All rights reserved.

Circle 263 on reader service card.

2MB to 3MB of RAM for the Win-OS/2 code alone. With Windows applications loaded, this amount triples. Additionally, Windows application-integration processes such as OLE don't work consistently between separate Win-OS/2 sessions, making compound-document creation a nightmarish process.

Fortunately, Win-OS/2 also allows you to run multiple Windows applications in one shared Win-OS/2 session, which is like running Windows but using a 32-bit OS/2 foundation instead of a DOS one. Application-integration processes like OLE, by the way, work flawlessly when all the applications are in the same session. (For more details, see "Win-OS/2 Separate Sessions," below.)

Q SEAMLESS MODE

My Windows application runs fine in full-screen mode under OS/2 but chokes when I try to run it in seamless Windows made. Can you explain this?

A: Some applications ignore Windows' rules for manipulating graphics and thus may not function properly when running seamlessly on the OS/2 desktop. They will run properly, however, in a full-screen Win-OS/2 session. You can configure an individual application to run in a full-screen Win-OS/2 session by clicking the right-mouse button on the application icon, selecting Open/Settings, the Sessions tab, and then the Win-OS/2 Full-Screen button. And contact the publisher of the Windows app—there may be an upgrade that fixes the problem.

Q FATAL ERROR

I get a "Fatal error 0X041" when trying ta start a Windaws applicatian in a Win-OS/2 session. What's the problem?

A: One or more of the drivers or font files listed in either the Win-OS/2 SYSTEM.INI or WIN.INI file is absent or not loading correctly. This can happen if the application migration or installation was incomplete or incorrect.

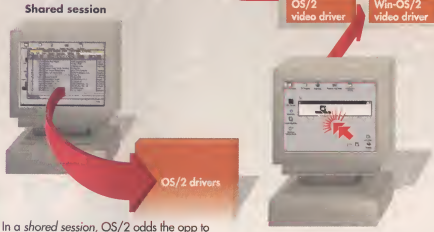
To solve this problem, either check the application's

WIN-OS/2 SEPARATE SESSIONS

The look and feel of seamless windows and full-screen mode.

There are two woys to run Windows 3.1 applicotions under OS/2 2.1: shared sessions and seporate sessions.

1. In o seporote session, when you double-click on the applicotion icon, OS/2 creates o virtual DOS mochine (VDM), o region of memory complete with its own video drivers, RAM, ond other hordwore settings.



2. Next, Win-OS/2 (o modified version of Windows 3.1 that's embedded in OS/2 2.1's code) loads into the VDM. Win-OS/2 either displays the applicotion on the OS/2 desktop ("seamless" windows) or switches control to the Win-OS/2 video driver and displays o complete Windows desktop (full-screen mode).

In o *shored session*, OS/2 odds the opp to the shared Win-OS/2 environment.

ASCEND

The Complete Personal Information and Contact Management System

For a Free 60-Day Evaluation Copy of Ascend Call 1-800-877-1814.

ASCEND is the award-winning, Windows-based PIM (Personal Information Manager) based on the popular time management techniques of Franklin Quest Co. Franklin is the world's leading time-management training firm. In addition to ASCEND being a PIM, it's also a contact manager and group scheduler!

ASCEND can print on either blank paper or Franklin Day Planner pages — allowing you to take with you everywhere your task lists, appointment schedules, contact information, address and phone listings, goals, and so on. ASCEND is available either with or without a Franklin Day Planner. ASCEND is also now available for Macintosh!

"I've become addicted to Ascend, which has changed my life for the better."
Jerry Pournelle, Byte

"Ascend is... awesome."
Jim Seymour, PC Week

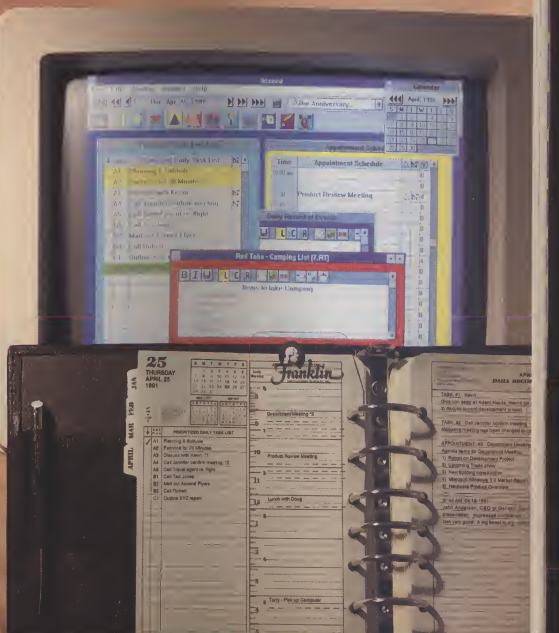
"Though PackRat comes close, this is Ascend that will satisfy PC users..."
M. Keith Thompson, PC Magazine

Now Version 4.0
with Contact Management
DDE, Pen Windows
support, and much more.

ASCEND is available at
Bookstores, Computer
Supercenters, and
Office stores.

Franklin Quest

[illegible] South Decker Lake Blvd.
[illegible] Lake City, UT 84119
[illegible]877-1814 • (801) 975-9992
[illegible]801) 975-9995
[illegible]19 on reader service card.



Small Footprint.

THE NEW SIDE*WRITER* PRINTERS FROM PANASONIC.

SideWriter

You're looking at the most extraordinary feat in laser-quality printing today. The feature-rich Panasonic® SideWriter LED printers deliver everything you're looking for in a printer, within a footprint that's smaller than an 8-1/2" x 11" sheet of paper. ❖ Obviously, these printers will fit neatly just about anyplace in your office or home. And at a little over 14 pounds, they are

Gigantic Feat.

the lightest and smallest laser-quality printers in their class.❖ The KX-P4400 is PCLA compatible, and delivers laser-quality printouts at four pages per-minute. It has an SRP of $649.❖ If you could use optional fax capability, PostScript Level 2, and more, pick up the KX-P5400 at an SRP of just $999.❖ Either way, you'll start performing your own gigantic feats.❖ Call 1-800-742-8086 for the dealer nearest you.

Panasonic Office Automation

Circle 205 on reader service card.

device statements or reinstall the application from Win-OS/2 in full-screen mode.

This error may also occur on systems running in XGA or 8514 mode when an application tries to use large fonts. In this case, edit your Win-OS/2 SYSTEM.INI file so that these font settings read as follows:

```
FONTS.FON=XGASYS.FON
FIXEDFON.FON=XGASFIX.FON
OEMFONTS.FON=XGAOEM.FON
```

SUPER TIP Having trouble establishing OLE links between Windows applications? Make sure they're running in a shared Win-OS/2 session and not in separate sessions.

Q CUT AND PASTE

I can't cut and paste between Windows applications running under OS/2. Why? Is there a workaround?

A: When using the Clipboard to exchange data between Windows apps running under OS/2, make sure the application has Video_Fast_Paste set to On. Failure to do so can result in garbled data.

Q NO MODEM

My modem won't work with Windows applications running under OS/2, although it works just fine under Windows. What do you suggest?

A: If you're having trouble with Windows communications applications running under Win-OS/2, try configuring the Win-OS/2 session with the following eight settings:

```
Idle_Seconds=60 (maximum)
Idle_Sensitivity=100 (maximum)
HW_Timer=On
HW_ROM_To_RAM=On
COM_Direct_Access=Off
COM_Hold=On
COM_Receive_Buffer_Flush=None
COM_Select=port used
```

You should also be sure to check for memory interrupt conflicts between serial-port hardware (this includes internal modems), because OS/2 tends to be quite sensitive to interrupt conflicts, particularly in ISA-bus systems.

SUPER TIP Sometimes the SetVGA command doesn't work. It often simply fails in the middle of the process for mysterious reasons. If SetVGA doesn't do the trick, try the following: Boot the installation disk to get to a command prompt, and change to the OS/2 subdirectory. Next, insert OS/2's disk 2 into the floppy drive, and type UNPACK VGA at the C: prompt. This prompts OS/2's Unpack program to unpack the VGA file bundle and automatically copy the files to the appropriate subdirectories. This ensures that any corrupted DLL files are copied over with their working versions from the installation disks. The most notorious such DLL is BVHVGA.DLL.

Q ABSENT DLLs

When running Windows apps under OS/2, I get a message stating that xx.DLL cannot be found. Why?

A: You've installed your Windows apps incorrectly, by copying them instead of installing them. Reinstall the Windows app that's causing trouble and make sure the specific dynamic link library (DLL) files are present in the OS2\MDOS\WinOS2 subdirectory.

You may also wish to verify that your Path statement includes an entry for the OS2\MDOS\WinOS2 subdirectory. This often corrects situations in which the DLL is present and intact yet not recognized by the system.

Q MIGRATED APPS

I was adjusting my OS/2 desktop when I realized that my migrated Windows apps no longer execute, even though they appear to load.

A: OS/2's support for migrated applications (applications added to the Workplace Shell desktop via the Migration utility) can be fragile. Seemingly unrelated functions can corrupt Win-OS/2's migrated configuration information. If you suspect this is the case, delete the desktop icons for the applications in question and remigrate them using the application Migration utility.

SUPER TIP If the Migrate utility doesn't do the trick, try deleting and reinstalling the application from within a full-screen Win-OS2 session. You can then remigrate the utility to the Workplace Shell desktop.

Q VIDEO DRIVER

I installed the video driver that came with my video card for seamless Windows support, and now OS/2 won't boot. How do I get back to VGA?

A: The easiest way is to boot from the OS/2 installation disk, and insert disk one when prompted. When the Welcome screen displays, press Esc to get to an OS/2 prompt, then change to the OS/2 subdirectory on which OS/2 is installed, and type SETVGA followed by the drive letter on which OS/2 is installed. For example, if OS/2 was installed in C:\OS2, type

```
SETVGA C:
```

If OS/2 came preinstalled on your system, add the /P parameter to the end of the command line. You should now be prompted for the appropriate Display Driver disk, and OS/2 will be reconfigured for VGA.

Randall C. Kennedy is a free-lance writer based in Osterville, Massachusetts.

It's easy to
Mind Your Own Business

Click here to see who owes you money.

Click here to *recall* checks and other transactions instead of re-keying them.

Click here to save money, by taking advantage of early payment discounts.

Click here to call the people you promised to call – it even dials for you!

That's because M.Y.O.B's To Do List shows you exactly where you stand.

You'll know in seconds what people owe you, what you owe them, and how much inventory you have on hand. *You'll have the information you need* to make good decisions and manage your business profitably.

And M.Y.O.B. makes running your business incredibly easy. With this Windows™-based software, everything you need is just a mouse click away. Want to bill a customer? Click "Invoice Sales" and fill in the blanks. The invoice screen looks like an invoice (just as the check-writing screen looks like a check).

It's equally easy to record receipts and track expenses and inventory. And even easier to stay in touch with customers and suppliers. Dial right from the Card File with a click of the mouse.

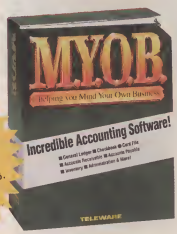
This full-featured program generates over 80 customizable reports. You can analyze sales by item, customer, time period and more. And every form you *print* is customizable, too, so it can look exactly as you want it to, logo and all.

Get **COGITO** the #1 selling computer game, a $59.95 value **FREE!** Just order M.Y.O.B. by 12/31/93

Now through December 31, it's inexpensive too!

~~$199.95~~ SRP

$99.95



We've won every industry award for accounting software in the past 18 months.

You could systematically compare accounting packages. But the seven leading computer publications have done it for you. *Every single one* declared M.Y.O.B. the best. In fact, over the past 18 months, M.Y.O.B. has won *every comparison* of accounting software in the industry.

And here's the even better news. Now you can get M.Y.O.B. for just $99.95 (plus $6 shipping and handling). What's more, you're free to try M.Y.O.B. for a full 90 days! If you are dissatisfied *for any reason*, simply return the program to us for a complete refund. **This special offer expires 12/31/93, so call today!**

U. S. and Canada, call

1-800-851-1315 Ext. 830

(7 AM to 7 PM CST)

or see your local software dealer.

Dealer pricing may vary. To order by mail, send your check (payable to Teleware) to: Special M.Y.O.B. Offer, P.O. Box 1339, Burnsville, MN 55337. NJ residents add 6% sales tax.

PC Computing · MACWORLD BEST BUY · PC MAGAZINE EDITORS' CHOICE · MACWORLD 1993 · TELEWARE · MACWORLD MW EDITORS' CHOICE · 1992-1993 W 100 WINDOWS WORLD CRITICAL WIN AWARD · 1992 · ★★★★

Requires IBM PC or compatible with 386-based processor or better, 4MB RAM, hard drive with approximately 5MB free space, Windows™ 3.0 or better (standard or enhanced mode), EGA or better, mouse. Hayes-compatible modem is optional. Windows-compatible printer is optional. Canadian (GST ready) and Macintosh versions available. M.Y.O.B. is a trademark of Teleware, Inc. All other products mentioned are trademarks of their respective companies.

NO MORE EXCUSES.

NOW THERE'S A 16-BIT SOUND BLASTER FOR EVERY APPLICATION AND BUDGET...AND NO MORE EXCUSES FOR OWNING ANYTHING LESS.

Every day, more people buy Sound Blasters than any other PC audio card. Except for a few of you, who keep putting off that all-important Sound Blaster™ decision. You know who you are. Well, our new line will make you a true believer.

SOUND BLASTER 16 BASIC: MORE VALUE.

For instance, some of you told us you were looking for 16-bit performance, but an 8-bit price.

So our new Sound Blaster 16 Basic offers the

U.S. inquiries: Creative Labs 1-800-998-5227 or 1-408-428-6600 **International inquiries:** Creative Technology Ltd., Singapore. TEL 65-773-0233 FAX 65-773-0353
Sound Blaster, Creative VoiceAssist, Wave Blaster and the Sound Blaster and Creative logos are trademarks of Creative Technology Ltd.

same great hardware as our premium models. But in a $199.95* no-frills package that's perfect for the first-time 16-bit user.

SOUND BLASTER 16 MCD: MORE CD-ROM OPTIONS.

Perhaps you'd bought another manufacturer's CD-ROM drive. Probably an oversight, we know, but that's no longer an excuse to deny yourself the finest in PC audio.

Creative VoiceAssist™ software and microphone provides voice-activated Windows control for Sound Blaster 16 MultiCD and SCSI-2 packages.

Just plug in a Sound Blaster 16 MCD. Its multi-CD format is 100% compatible with best-selling drives from Sony, Mitsumi and Panasonic.

The MCD can even run two different drives at the same time. Which only makes sense, considering our $249.95* price will save you enough money to buy the second one.

SOUND BLASTER 16 SCSI-2: MORE SCSI COMPATIBILITY.

Maybe you were waiting for a full-featured SCSI interface. Well, wait no longer.

As the name implies, our Sound Blaster 16 SCSI-2 meets the new, more comprehensive generation 2 SCSI standards. Others don't.

And our card runs the complete battery of SCSI peripherals, not just CD-ROM. Best of all, it includes one of the most comprehensive software bundles in the business and does it for a remarkable $279.95.*

TRUE "PLUG & PLAY" UPGRADABILITY.

Speaking of things other cards can't do, our unique scalable platform lets you add advanced options as you need them.

Boost CPU efficiency by up to 65% with an Advanced Signal Processing upgrade.

So once you stop making excuses and get your Sound Blaster 16, upgrading to Wave Blaster™ Sampled Wave Synthesis (courtesy of the MIDI wizards at E-mu) or our own Advanced Signal Processing option (a Creative Labs exclusive) is literally as easy as adding a daughter board or plugging in a chip.

Upgrade MIDI applications and soundtracks to Sampled Wave Synthesis with a Wave Blaster daughter board.

JUST WHEN YOU THOUGHT YOU'D HEARD EVERYTHING...

Along comes Sound Blaster 16. The no-more-excuses sound card. Exactly what you'd expect from Creative Labs, developers of the industry standard 16-bit audio platform.

For more information and the name of your nearest Creative Labs dealer, call 1-800-998-5227.

	Sound Blaster 16 Basic Edition	Sound Blaster 16 MultiCD	Sound Blaster 16 SCSI-2
Format	16-bit stereo	16-bit stereo	16-bit stereo
Advanced Signal Processing Upgradability	Yes	Yes	Yes
Wave Blaster Upgradability	Yes	Yes	
CD-ROM Compatibility	Creative Labs/ Panasonic	Sony, Mitsumi, Creative Labs/ Panasonic	Any SCSI or SCSI-2
Bundled Hardware		Microphone	Microphone
Bundled Software	Monologue for Windows Creative WaveStudio Creative Sound! LE Creative Talking Scheduler Creative Mosaic	Software Toolworks Multimedia Encycl. PC Animate Plus Monologue for Windows Creative WaveStudio Creative Sound! LE Creative Talking Scheduler Creative Mosaic Creative VoiceAssist	Software Toolworks Multimedia Encycl. PC Animate Plus Monologue for Windows Creative WaveStudio Creative Sound! LE Creative Talking Scheduler Creative Mosaic Creative VoiceAssist
Suggested Retail	$199.95	$249.95	$279.95
W/ Advanced Signal Processing Upgrade	Not applicable	$299.95	$329.95

Sound BLASTER™ CREATIVE™ CREATIVE LABS, INC.

Circle 271 on reader service card.

All other trademarks are the property of their respective holders. © Copyright 1993 Creative Technology Ltd. All rights reserved
*SRP Note: Sound Blaster 16 MCD works with Sony CDU31A and CD31A-003, Mitsumi CRMC-LU005s, -FX001 and -FX001D, and Panasonic CDR-523 and -563

When All Else Fails Try These Tips

Warning: Windows may be hazardous to your health. Part Two covers little-known cures for common maladies.

The surgeon general ought to slap a warning label on Windows. Its general protection faults (GPFs) can cause high blood pressure, its strange error messages can promote premature hair loss, and its subtle quirks can induce hives. What to do? We prescribe this special troubleshooting section of our Superguide. It details step-by-step instructions for banishing GPFs once and for all. Our plain-English guide to Windows' cryptic error messages will save you a toll call to Microsoft's tech support. We also provide a list of programs that Windows 3.1 is allergic to—so you don't have to find out the hard way. Finally, to keep your system running at peak performance, Windows expert Brian Livingston offers his all-time favorite undocumented Windows secrets. After all, Windows is supposed to make your life easier, not shorter.

—*Ed Bott*

THE DANGEROUS ART

Uninstalling Windows apps—safely.

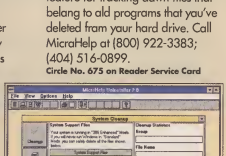
Juggling steak knives. Tassing flames. Dismantling hand grenades. Uninstalling Windows applications. There are certain things you shouldn't try at home.

Occasionally, however, you'll want to remove a Windows program from your system. Simply killing the program's icon and deleting the directory that houses its main files isn't enough. Windows applications also insinuate themselves into other directories, add a pile of new dynamic link library (DLL) files to your Windows directory, and leave their fingerprints all over your WIN.INI and SYSTEM.INI files. Trying to locate and delete all of these files manually is like petting a rattlesnake—we don't recommend it.

There's help, however, in a clever utility called Uninstaller, a $79 program from MicroHelp. Tell Uninstaller to delete a program and it automatically tracks down the files related to the application and offers you the option of deleting them. Uninstaller also displays a list of lines in your SYSTEM.INI and WIN.INI files associated with the application you're deleting and offers to remove them.

Version 2.0 of the program includes a new orphan-finder feature for tracking down files that belong to old programs that you've deleted from your hard drive. Call MicroHelp at (800) 922-3383; (404) 516-0899.

Circle No. 675 on Reader Service Card



Uninstaller 2.0 takes the guesswork and peril out of deleting a Windows application.

There's just one choice: Insist upon a printer with genuine Adobe™ PostScript™ software inside. It's the industry standard—the only way to guarantee that your printer will work with virtually every software application and hardware environment today and tomorrow. With Adobe PostScript, you're assured the highest quality output whether you're printing from DOS, Windows™, OS/2®, Macintosh® or UNIX®, from a PC or a mainframe. And since almost every major printer manufacturer offers

THE MOST IMPORTANT CHOICE YOU'LL MAKE WHEN CHOOSING A PRINTER, ISN'T JUST THE PRINTER.

Adobe PostScript printers, it's easy to choose the brand of printer that's right for your company. Remember, the best choice is the clear choice. Make sure your next printer has genuine Adobe PostScript. Accept no substitutes. For a free guide on how to choose a printer, call 1-800-962-3623, Dept. L, Ext. 6806.

Outside the U.S.A. and Canada call your local distributor or 408-986-6555. Adobe, the Adobe logo, PostScript and the PostScript logo are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. Windows is a trademark of Microsoft Corporation. OS/2 is a registered trademark of International Business Machines Corporation. Macintosh is a registered trademark of Apple Computer, Inc. UNIX is a registered trademark of UNIX System Laboratories. ©1993 Adobe Systems Incorporated. All rights reserved.

IT'S NOT JUST PRINTING, IT'S ADOBE POSTSCRIPT PRINTING.

Adobe™

Circle 168 on reader service card.

Plagued by Odd Program Errors?

Check this list of known incompatibilities for quick solutions and workarounds.

Product	Known Problem	Workaround
Adobe Illustrator	Older versions are incompatible with Windows 3.1.	Upgrade to Version 4.0 or later.
Adobe TypeAlign	Older versions are incompatible with Windows 3.1.	Upgrade to Version 2.1 or later. To run earlier versions, remove the line that reads LOAD=TALGNDLL.EXE from your WIN.INI file.
Aldus FreeHand	In Version 3.0 the tutorial will not run; printer drivers may not print TrueType fonts.	Upgrade to the most current version of FreeHand, or change your printer setup in the Control Panel to print TrueType as graphics.
Aldus Persuasion	In Version 2.0 printer drivers may not work properly with Windows 3.1.	Select the generic PostScript printer driver in the Control Panel to print PostScript files, or upgrade to the most current version.
Bitstream FaceLift	Some screen elements may not look the same in Windows 3.1 as they did in 3.0, particularly with advanced display drivers.	Try using Microsoft's built-in VGA driver, or upgrade FaceLift to Version 2.0 or later.
Central Point Software PC Tools	The VFD.386 file shipped with Windows 3.1 is incompatible with Version 7.1.	Use the VFD file that ships with PC Tools instead. Upgrade to a more current version.
Computer Support Arts and Letters	Screen contents may not display properly after resizing windows with older versions.	Upgrade to Version 3.11 or later.
Hewlett-Packard NewWave	Older versions are incompatible with Windows 3.1.	Upgrade to Version 4.0 or later.
Lotus Ami Pro	Older versions are incompatible with Windows 3.1.	Upgrade to Version 2.0 or later.
Microsoft Bookshelf for Windows	Versions before 1991 are incompatible with Windows 3.1.	Upgrade to 1993 version.
Microsoft PowerPoint	Printer drivers are named differently than under Windows 3.0 and will not be properly recognized by PowerPoint Version 2.0e.	Select a printer driver other than the default Genigraphics printer driver or upgrade to the latest version of PowerPoint.
Microsoft Word for Windows	TrueType fonts won't appear in Word's list of fonts in Version 1.1.	Select Print Setup from Word's File menu. When the Print Setup dialog box appears, click on OK to close the window. Upgrade to the latest version.
SofNet Faxit for Windows	There are intermittent errors when sending faxes with older versions.	For versions earlier than 2.5, add COM=BUFFER=0 to the [386Enh] section of SYSTEM.INI, or upgrade to Faxit 2.5 or later.
Software Publishing Harvard Graphics for Windows	The MagiCorp printer driver is not compatible with TrueType.	Select a printer driver other than MagiCorp's or obtain an updated version of the driver.
Spinnaker Software PFS:WindowsWorks	Version 1.1 may not be able to print files in landscape mode.	Upgrade to a more current version.
Symantec Norton Desktop	In Version 1.0 you may need to select an icon twice to change its label.	Add the line DEVICE=VDMADX.386 to the [386Enh] section of SYSTEM.INI, or upgrade to a more recent version of Desktop.
WordPerfect 5.1 for Windows File Manager	May not run the same under Windows 3.1 as it did in 3.0.	Upgrade to a more current version.

Windows Demons

Four steps to banishing GPFs for good. **BY SALLY NEUMAN**

They snatch your data. They turn your applications to stone. They appear and vanish without notice. They're general protection faults (GPFs)—Windows demons.

Actually, GPFs are Windows' way of telling you that two applications or device drivers are trying to occupy the same address in memory. The most common causes of GPFs are carelessly designed device drivers, though other things may trigger them as well. Fortunately, Windows typically identifies the program responsible for a GPF in an error message. Record that information and follow these steps to banish GPFs for good.

Step 1. Check the version and brand of DOS that you are running. Microsoft recommends that you run an OEM version of DOS only if it came with your system. In other words, run the DOS that comes with a Compaq system only on a Compaq machine. Microsoft's DOS 5.0 and 6.0, IBM's DOS 6.1, and other products that are not system-specific shouldn't trigger GPFs.

Step 2. Temporarily disable any TSRs and network drivers. TSRs and network drivers that you're loading into memory via AUTOEXEC.BAT and CONFIG.SYS files may be incompatible with Windows 3.1. Try booting your system without these drivers and programs to see if the problem vanishes.

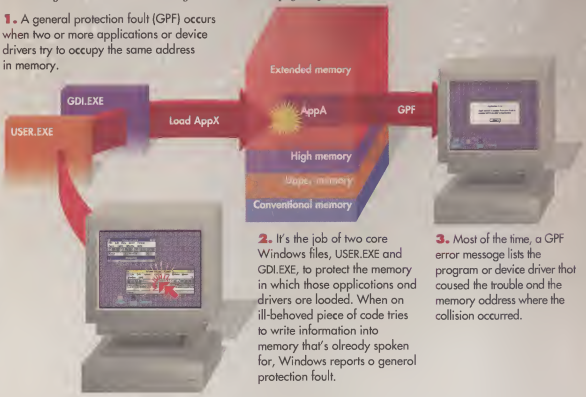
Step 3. Test for a page-mapping conflict. Type WIN /S to load Windows in standard mode or WIN /3 /D:X to exclude the upper memory area. Now try to duplicate the GPF. If it vanishes, you have a page-mapping conflict. To get around this, reconfigure your memory manager.

Step 4. Reinstall the program or device driver in the GPF message. Corrupt drivers and program files are frequently the cause for GPFs. So are bugs. Reinstall the driver or software program that's giving you problems. Failing that, contact the manufacturer or software publisher—they frequently issue program and driver updates to correct the bugs that trigger GPFs.

GENERAL PROTECTION FAULTS

Knowing how and where they occur can help you prevent them.

1. A general protection fault (GPF) occurs when two or more applications or device drivers try to occupy the same address in memory.



2. It's the job of two core Windows files, USER.EXE and GDI.EXE, to protect the memory in which those applications and drivers are loaded. When an ill-behaved piece of code tries to write information into memory that's already spoken for, Windows reports a general protection fault.

3. Most of the time, a GPF error message lists the program or device driver that caused the trouble and the memory address where the collision occurred.

22

BUSINESSES ARE USING MICROSOFT ACCESS TO TRACK WORMS, MOVE PEOPLE, AND MAKE WISHES COME TRUE.

HOW WILL YOU USE IT?

"Our information was in a variety of locations: filing cabinets, notebooks, people's heads," recalls Bob Wolf, 3M Product Development Engineer. "The business problem we had was not being able to access our information effectively." They chose Microsoft Access to build their database of ideas, maintain mailing lists, generate surveys, and more. "It saves time in training, in building the databases, and it saves time in accessing the information." Which leaves more time to concentrate on turning wishes into the products people want.

Managing data and reporting are easier.

Scott Emmons, Professor of Molecular Genetics at Albert Einstein College of Medicine, spends a lot of time with worms. Thousands of them. As a basic research tool, nematode worms are a valuable part of learning how DNA forms and generate timetables for bus riders and drivers, they've all but eliminated scheduling errors, and saved countless hours of proofing and information-transfer time. Plus, they can track ridership by customer segment and keep tabs on the productivity of every route. Now they plan to use Microsoft Access to help grow their rideshare program.

"Microsoft Access has given us a lot of capabilities, not just report writing, but access to the data, and configuring it the way we need it for reporting and tracking," notes Richard. "Plus it's easy, so people are happy." And that's bound to keep Intercity Transit headed in the right direction.

Now everyone in your organization can work smarter—if they work with Microsoft Access. If you use another database or any Microsoft Office

YES! I WANT TO CREATE MY OWN SUCCESS STORY USING MICROSOFT ACCESS. SEND MY COPY NOW FOR JUST $149.

This special upgrade offer expires January 31, 1994. For your Microsoft Access upgrade, see your local reseller. For the name of a reseller near you or to order by phone, call (800) 894-6636, Dept. VL7. Or fill out the order form below and return it to Microsoft.

To qualify for this offer, I understand that I must be a licensed user of one of the following products:

__Paradox® __dBASE® __Superbase® __R:BASE®
__Approach __FoxBASE+® __FoxPro® __Q&A
__PowerBuilder™ __DataEase® __Microsoft® Office
__Microsoft Excel __MS® PowerPoint® __MS Word __MS Mail

Customer's signature

Name

Company name (if company licenses product)

Address

City State ZIP

( )
Daytime phone (in case we have a question about your order)

Please check disk size:*
☐ 3.5" Kit No. 077-051-209

Rush me my copy of Microsoft Access 1.1
____ (quantity) at $149 each $ _____

Sales tax** (see list below) $ _____

Freight ($10 per unit) $ _____

Total cost $ _____

Payment method:
Please do not send cash or purchase orders. Make checks payable to Microsoft.

☐ Check or money order enclosed
☐ MasterCard ☐ VISA American Express

Check or credit card number: Expiration date:

Cardholder's signature

* If you need 5.25" disks, please call (800) 894-6636.

** Add the applicable sales tax in the following states: AR, AZ, CA, CO, CT, DC, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, ND, NE, NJ, NM, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, and WY. Microsoft reserves the right to correct tax rates and/or collect the sales tax assessed by additional states as required by law, without notice.

Offer expires January 31, 1994, and is good only in the 50 United States. Only original order forms will be accepted. Please allow 2 to 4 weeks for delivery upon receipt of this order form by Microsoft. Your check will be deposited immediately upon receipt. If you have questions about this offer, call (800) 894-6636, Dept. VL7, before returning this order form. If you require Text Telephone (TT/TDD) services for people who are deaf or hard of hearing, call (800) 892-5234.

© 1993 Microsoft Corporation. All rights reserved. Microsoft, FoxBASE+, FoxPro, Microsoft Access, MS, and PowerPoint are registered trademarks of Microsoft Corporation.

VL7

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 213 BUFFALO, NY

POSTAGE WILL BE PAID BY ADDRESSEE

MICROSOFT ACCESS UPGRADE OFFER
PO BOX 690
BUFFALO NY 14207-9908

BUSINESSES ARE USING MICROSOFT ACCESS TO TRACK WORMS, MOVE PEOPLE, AND MAKE WISHES COME TRUE.

HOW WILL YOU USE IT?

$149* 90-DAY GUARANTEE

You may have heard that the introduction of the Microsoft Access® database management system was incredibly successful. In fact, we've now shipped over a million copies. What you may not know is that this relational database for the Windows™ operating system is being used worldwide in a number of imaginative ways. Once you hear these success stories, you'll want to create one of your own.

Now everyone can get access to data.

The Commercial Office Supply Division at 3M® is always on the lookout for new product ideas. After all, the next Post-it™ note could be right around the corner. But until recently, they were missing a way to organize all of the "product wishes" floating around their department into a format everyone in the group could easily share and use.

"Our information was in a variety of locations: filing cabinets, notebooks, people's heads," recalls Bob Wolf, 3M Product Development Engineer. "The business problem we had was not being able to access our information effectively." They chose Microsoft Access to build their database of ideas, maintain mailing lists, generate surveys, and more. "It saves time in training, in building the databases, and it saves time in accessing the information." Which leaves more time to concentrate on turning wishes into the products people want.

Managing data and reporting are easier.

Scott Emmons, Professor of Molecular Genetics at Albert Einstein College of Medicine, spends a lot of time with worms. Thousands of them. As a basic research tool, nematode worms are a valuable part of learning how DNA forms the blueprint for life. For Scott, managing the variety of data associated with each different mutant worm strain—and being able to generate reports on his research quickly—is critical to keeping his lab running smoothly. He turned to Microsoft Access.

"A major part of the way I'm using Microsoft Access is the reports that I generate," says Scott. "I can sort the data a number of ways, and the ease of use means I can quickly scan these reports to locate a particular strain." And that means a lot less strain on Scott.

The uses are endless.

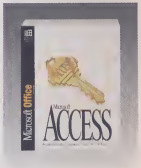
Intercity Transit in Olympia, Washington, recently moved from Paradox® because of the superior reporting capabilities in Microsoft Access, and its interoperability with other Microsoft applications. "To go with our suite of Microsoft® Office products, we felt it was the best choice for us," explains Richard Madrid, Intercity Transit MIS Specialist.

Today, Intercity Transit relies on Microsoft Access to keep them running—literally. By using it to maintain and generate timetables for bus riders and drivers, they've all but eliminated scheduling errors, and saved countless hours of proofing and information-transfer time. Plus, they can track ridership by customer segment and keep tabs on the productivity of every route. Now they plan to use Microsoft Access to help grow their rideshare program.

"Microsoft Access has given us a lot of capabilities, not just report writing, but access to the data, and configuring it the way we need it for reporting and tracking," notes Richard. "Plus it's easy, so people are happy." And that's bound to keep Intercity Transit headed in the right direction.

Now everyone in your organization can work smarter—if they work with Microsoft Access. If you use another database or any Microsoft Office program, you can take advantage of our special $149** offer today, which includes a 90-day money-back guarantee. Then you can create your own success story. When you do, we'd love to hear it—simply write to: Microsoft Access Product Manager, One Microsoft Way, Redmond, WA 98052.

For the name of your local reseller, or to order by phone, call (800) 894-6636, Dept. VL7.



Microsoft®

*Special offer for users of competitive database products and Microsoft Office.

**Plus freight and applicable sales tax when ordering direct from Microsoft. Reseller prices may vary. Offer expires January 31, 1994, and is good only in the 50 United States. ©1993 Microsoft Corporation. All rights reserved. In the 50 United States, call (800) 894-6636. For information only. In Canada, call (800) 563-9048; outside the 50 United States and Canada, call your local subsidiary or (206) 936-8661. Microsoft and Microsoft Access are registered trademarks and Windows and the Windows logo are trademarks of Microsoft Corporation.

PC/Computing's Secret Decoder Ring

Easy solutions to Windows' most vexing error messages.

Error Message	Translation	Solution
A serious disk error occurred while writing to drive *D:*.	Running both SmartDrive and dBASE IV disk cache program causes Windows to hang.	Disable dBASE's CACHEDB.EXE cache utility or disable SmartDrive.
Call to Undefined DynaLink.	An outdated DLL file (usually the one named TOOLHELP.DLL) resides in your system's Windows directory. This message also appears with older versions of SHELL.DLL, OLECLI.DLL, OLESVR.DLL, and COMMDLG.DLL.	Search for the file called TOOLHELP.DLL in the Windows directory and delete it. The proper version of TOOLHELP.DLL should be located in the Windows System subdirectory, should have a date of 3/10/92 or later and should have a size of 14,128 bytes. The other DLL files should also be dated 3/10/92 or later and reside in the Windows System subdirectory.
Cannot find *drive:filename* (or one of its components). Check to ensure the path and filename are correct and that all required libraries are available.	A program file is corrupt or missing, or your system's CMOS settings for the floppy drive type are incorrect.	Reinstall the program or check to ensure that the program you're trying to run is on the floppy disk in the drive. If the problem persists, run your system's CMOS setup utility and inspect the floppy-drive type settings.
Cannot find KRNL386.EXE (or KRNL286.EXE).	Windows can't find its core file KRNL386.EXE (or KRNL286.EXE) at startup.	First, make sure the Windows directory is in your DOS path. Then reinstall KRNL386.EXE or KRNL286.EXE from the original Windows 3.1 program disks.
EMM386 exception error.	An application has passed an invalid procedure to the CPU due to a corrupt EXE or DLL file.	Reinstall the program that triggers the error.
EMM386: Unrecoverable privileged operation error. Press Enter to reboot.	DOS's memory manager, EMM386, is configured incorrectly for Windows. Alternatively, a hardware device in your system is set up improperly.	Edit your system's CONFIG.SYS file using any text editor and type REM in front of the line that contains a reference to EMM386. If the error disappears, reconfigure EMM386, save the changes, reboot your system, and try the process again. If the error persists, check the setup of recently installed hardware devices.
Error loading PROGMAN.EXE.	The Shell line in your SYSTEM.INI is blank or incorrect.	Open your SYSTEM.INI file (found in the Windows directory) using a standard text editor and edit the line that begins Shell= to read Shell=PROGMAN.EXE.
Group file error. Cannot open program group file *filename*.grp. Do you want Program Manager to try and load it in the future?	A program group listed in the [Groups] section of PROGMAN.INI cannot be found, or the file is corrupt.	Select No and recreate the group using Program Manager's File menu. To recreate a major Windows group such as Main, Games, Startup, or Accessories, run Windows Setup from DOS by typing SETUP /P.
Inadequate DPMI server.	The files KRNL386.EXE and WIN386.EXE on your system may be different from the Windows versions. Alternatively, your PC's memory-configuration settings (in CMOS) don't match the amount of memory installed.	Check the file dates on KRNL386.EXE and WIN386.EXE (located in the Windows System subdirectory). If either is dated before 3/10/92, then rename or delete it. Copy new versions of these files from your original Windows 3.1 disks to your Windows System subdirectory. Also check your system's memory CMOS settings to be sure they match your hardware.

Error Message	Translation	Solution
Insufficient memory to run application; close one or more applications to increase available memory and try again.	Your system is low on memory or the floppy drive type specified in your system CMOS settings may be incorrect. Corrupt program files may also be responsible.	Close down applications and try loading the program again. If the error persists, run your system's CMOS setup utility and inspect the floppy drive type settings to ensure that they're correctly configured. If the problem persists, reinstall the faulty program.
Invalid TrueType font detected. An application has used a TrueType font that caused an error in Windows. Quit all applications and then restart Windows.	A TrueType font file is corrupted. When Windows detects the error, it disables the availability of TrueType to the application.	Delete the corrupted font file or files. To do this, go into Windows' Control Panel and select the Fonts icon. Click on the fonts listed by name one at a time—corrupt font files won't display a preview of the font or will list the font's file size as zero. Remove fonts that don't display properly by selecting the Remove Font File from Disk option and clicking on Remove. To reinstall the original font file, click on Add and load the file from its original floppy disks.
Not enough memory to start the specified application.	Your system lacks enough memory to run the program or the floppy drive type specified in your system's CMOS may be incorrect.	Check the system requirements for loading the program to ensure that you have enough RAM installed. If you have enough memory installed, run your system's CMOS setup utility and inspect the drive type settings to ensure they're correct.
Server failed to open document. Possible invalid link.	The file to which an OLE 1.0 object is linked has been renamed or moved to another directory.	Look in your application under the menu that you used to establish the OLE link. Select the option Update Link (or a similar choice) and reestablish the link to the original file under its new name and location.
Stack overflow.	The STACKS setting in CONFIG.SYS is too low.	Using a text editor, edit the STACKS line in your system's CONFIG.SYS file to read STACKS=9,256. Save the changes, reboot, and try the operation that triggers the error again.
Standard mode: Fault in MS-DOS Extender.	Windows files may have been corrupted during installation. Early versions of the DR DOS operating system aren't completely Windows 3.1 compatible. Bad RAM chips may also be the culprit.	First, reinstall Windows. If the problem persists, try another set of floppy disks if possible. Call Microsoft for replacement floppy disks if necessary (800-426-9400). DR DOS users should call Novell for a patch. Also, check the integrity of system RAM chips using a diagnostic such as CheckIt Pro from TouchStone Software (800-531-0450).
Windows cannot print this file. Disk may be full.	The TEMP directory in AUTOEXEC.BAT isn't valid or you're running out of hard disk space.	First, edit AUTOEXEC.BAT with a text editor and make certain the line that begins SET TEMP= points to a valid directory. Then delete or archive files from your hard drive to free disk space.
***Driver* cannot load due to conflict with another virtual device.**	SYSTEM.INI is trying to load the same device driver twice. Windows won't load until you remove one of the references to the driver in SYSTEM.INI.	Open SYSTEM.INI (located in the Windows directory) with a text editor and comment out one of the references to the driver listed in the error message. To comment out a line, type a semicolon in front of it. Save the changes and restart Windows.

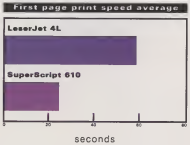
Wa
sec

If you have to wait much longer to print, you need

You see, the NEC Silentwriter SuperScript 610 is the only laser printer that begins printing the second you press "Print." So there is absolutely no waiting. And the only laser printer with a first page print speed that's three times faster than the HP® LaserJet® 4L.

The first Windows™ printer.

In fact, the SuperScript 610 is a whole new way of printing. That's because it's the only personal laser printer that directly interfaces with Windows. So it's as upgradable as your PC. That means as your PC gets better, so does your printer. In fact, this printer will print exactly what you see on your screen. Fonts, DOS applications, everything. And at less than $700 it's an even better value than you thought.



Based on 486-66 MHz PC with 8MC RAM. Average speed based on printing one-page documents from word processing, spreadsheet, presentation and graphics applications.
Silentwriter is a registered trademark of NEC Corporation and SuperScript and PerFacts are trademarks of NEC Technologies Inc. All other trademarks are property of their respective owners. © 1993 NEC Technologies Inc. NEC GSA# GS00K93AGS5241

Everything. We. Must. Be. Perfect.

t a
ond.

a Silentwriter® SuperScript™ 610.

See what's happening, while it's happening.

The SuperScript 610 even sends an on-screen status display to your PC that tells you exactly what's going on. So screaming, cursing and kicking your printer are no longer necessary.

And it comes with a 2-year replacement warranty. So, if by some remote chance your SuperScript 610 runs into bigger problems than an empty paper tray, have no fear.

We'll get you a new one overnight. If you can wait that long.

For more information on this exciting new technology, call 1-800-NEC-INFO. Or via fax, call NEC FastFacts™ at 1-800-366-0476. Request document #SW610.

Circle 243 on reader service card.

NEC

Built-in Windows plus 50MHz 486DX2 processor (with coprocessor) for blazing performance.

New brilliant Active Matrix display – 640 x 480 VGA with high-speed video system for lightning fast graphics.

The notebook industry's first 4mm, full-travel keyboard with the look and feel of a desktop system.

ACTIVE COLOR. 486DX2 50MHz POWER. WINDOWS IN 15 SECONDS. HEY, WHAT ARE YOU WAITING FOR?

If you've been waiting for an active matrix color notebook with true desktop power, your wait is over. Thanks to the new TravelMate™ 4000E WinDX2™/50 Active Matrix Color notebook from Texas Instruments.

50MHz DX2 processor with coprocessor provides desktop performance in a notebook.

With 256 brilliant, simultaneous colors and a 50MHz 486DX2 processor, this powerhouse doesn't just whisper color, it screams it.

And yet the TravelMate 4000E weighs a mere 6.2 pounds, including battery. This convenient size and weight gives you more performance* than the leading 486 notebooks. And the industry's first 4mm, full-travel keyboard gives you the feel of a desktop.

Of the leading active matrix color notebook manufacturers, only TI offers the desktop performance of a 50MHz DX2 processor.

Active Color Notebook	*Weight (lbs.)*	*486 Processor*	*Speed*	*Coprocessor*
TravelMate 4000E	**6.2**	**DX2**	**50MHz**	**Yes**
Toshiba T4600C	6.9	SL	33MHz	Yes
Compaq LTE Lite 4/33c	6.5	SL	33MHz	Yes
IBM ThinkPad 720C	7.8	SLC2	50MHz	No

Thanks to built-in Windows 3.1 and useful TI utilities, you can power up to Windows in just 15 seconds. And the TravelMate 4000E is Windows NT-compatible. With 4MB of main memory, expandable to 20MB, you're ready for today's and tomorrow's software.

If you work on the go, you'll also go for the rugged 200MB hard disk drive, the high-speed video bus and 1MB of video RAM, as well as the full range of connectivity options – snap-on modules for Ethernet™ LANs, SCSI-compatible devices and an internal 14,400 bps V.32 bis modem with 9,600 bps send/receive fax capability.

For more information about the only 486 notebook family that won five Editor's Choice awards in PC Magazine's August issue, call *1-800-527-3500*.

TI TravelMate 486DX2 Notebooks

50MHz Active Color

50MHz Monochrome

40MHz Enhanced Passive Color

intel inside

EXTENDING YOUR REACH WITH INNOVATION™

TEXAS INSTRUMENTS

*Based on industry standard application performance speed tests. TravelMate, WinDX2 and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Ethernet is a registered trademark of Xerox Corp. The intel Inside logo is a trademark of Intel Corp. ©1993 TI

Circle 268 on reader service card.

Secrets from a Guru

Brian Livingston reveals tips Microsoft didn't tell you.

PHOTOGRAPH BY REX ROSTON

Face it—the coolest software tips and tricks are *never* in the manual. Windows 3.1 has dozens of undocumented features that can help you work faster and better. Here are ten favorites:

1 Launch macros from icons. Why launch macros from Recorder when you can set up an icon to do the same thing? To assign a macro to an icon, start the Windows Recorder, click on the Record Macro button, and record the keystrokes that carry out your most frequent tasks in any Windows application. Assign a hotkey combination (like Ctrl-Shift-F10) to your macro and save it in a file named MACROS.REC (or something along these lines). Then make a Program Manager icon (select File, New, Program Item from Program Manager's menus) and, on the entry for Command Line, use Recorder's undocumented -H (hotkey) switch as follows:

```
RECORDER.EXE -H ^+F10 C:\MACROS.REC
```

In this example, the caret (^) represents the Ctrl key, and the plus sign (+) represents Shift. If your hotkey includes the Alt key, use a percent sign (%) to represent it. Now select an icon for your macro and save your changes. When you double-click on the new icon, it launches Recorder and runs your macro. Incidentally, the icon won't work if Recorder is already running in the background; in these cases use the hotkey combination for the macro.

2 Is the Windows logo etched in your retina? Kill it. To start Windows without displaying the Microsoft logo, type WIN, then a space, and then press the F7 key. This will look like WIN ^@ at the DOS prompt. Then hit Enter. Windows will bypass the overexposed Windows banner altogether. Add this command line to a batch file that starts Windows and you'll never have to stare at that logo again.

3 Make your macros work harder. You can't easily edit macros that you create with the Windows Recorder—you have to rerecord them to make even minor changes (a good argument for keeping your macros short). A workaround? Record a macro that runs a series of other macros. For example, you could create macros with Ctrl-Shift-1, Ctrl-Shift-2, and so on, as hotkeys, then record a macro that activates up to five of these hotkeys in turn. These smaller, individual macros are much easier to troubleshoot and change. If you can't figure out why a macro is failing, use an undocumented feature of Recorder: While a macro is selected in the Recorder window, hold down Shift while you click on Macro Properties. This displays the exact keystrokes you've recorded, which may reveal the problem.

4 Make Windows Help easier to read. In Windows Help files, certain words appear in color. You can double-click on these words to "jump" to other topics. But the pale green color used for these words makes them hard to read—particularly on monochrome notebook displays, but also on many color monitors. Fortunately, you can change these colors.

To do this, add the line JumpColor=0 0 128 in the [Windows Help] section of WIN.INI. This makes the words a dark, bold blue. You can get numbers for other red-green-blue (RGB) color combinations in the Control Panel's Color dialog box. (Click on the Color Palette button, then click on the Define Custom Colors button to see the RGB numbers for specific colors.)

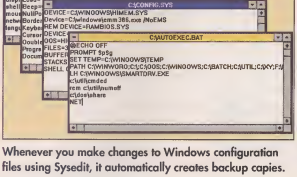
5 Squeeze more out of your DOS apps under Windows. To display more lines in your DOS sessions under Windows, add the line ScreenLines=50 to the [NonWindowsApp] section of your SYSTEM.INI file and restart Windows. Most VGA and better adapters support a 50-line mode under Windows. ScreenLines=43 also works with most video adapters.

Other Windows Help keywords you can "colorize" besides JumpColor are PopupColor, MacroColor, IFJumpColor, and IFPopupColor.

6 Save your Program Manager and File Manager changes on demand. You can't save configuration changes to Program Manager or File Manager until you exit them—unless you know this shortcut: Hold down the Shift key in either Program Manager or File Manager while you click File Exit. Instead of exiting, this forces these applications to save their current configurations. To take this one step further, click on the Options menu in either program and turn off the Save Settings on Exit menu item. Now you can save your preferred configuration whenever you like, and it will appear the next time each program starts up.

7 Edit your configuration files in a snap using Sysedit. Forget about exiting to DOS to edit your Windows system files—use Windows' own editor called Sysedit. To run Sysedit, go into File Manager in the Windows system subdirectory, select the file called SYSEDIT.EXE, and drag the file into a Program Manager group. This automatically creates an icon for Sysedit.

Double-clicking on the Sysedit icon loads copies of your system's CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, and SYSTEM.INI files simultaneously. You can now edit and search these files as necessary. Whenever you make changes to any of these files, Sysedit automatically creates a backup copy of the file with a .SYD extension. If you make an editing mistake in WIN.INI, for example, which prevents Windows from loading, simply go to your Windows directory at a DOS prompt and type COPY WIN.SYD WIN.INI. This restores WIN.INI to its original, working version. You can then try the editing process again (more carefully, this time!).



Whenever you make changes to Windows configuration files using Sysedit, it automatically creates backup copies.

8 Keep tabs on Windows. To remind yourself that Windows is running in the background when you're using a full-screen DOS session under Windows, add the following line to your AUTOEXEC.BAT file (using a text editor or Sysedit) and reboot:

```
SET WINPMT=[In Windows] $P$G
```

Windows displays [In Windows] C:\> as your prompt in DOS sessions instead of your regular prompt. You can substitute other words in the brackets if you prefer. WINPMT supports the same special commands as PROMPT, which are listed in your DOS manual. Since WINPMT will remind you when you're in a DOS session under Windows, you won't need the big box that Windows 3.1 displays every time you shell out to DOS. You can turn this box off by adding the line DOSPromptExitInstruc=False to the [386Enh] section of your SYSTEM.INI file and restarting Windows.

9 Get a better look at File Manager. Hold down the Shift key while you click Window Tile in File Manager. Instead of tiling two open windows above and below each other, File Manager tiles them side by side. This is much more useful—similar to the side-by-side layout of famous DOS utilities such as XTree and Norton Commander.

10 Take control of DOS sessions. You may need to run a batch file to set up certain parameters in a DOS session under Windows—to create a special prompt or directory, for example. But your DOS session closes after the batch file runs. How can you keep the window open to use the DOS prompt? One way is to make the last line of your batch file read %COMSPEC%. The environmental variable COMSPEC, framed by percent signs, always represents the location of your command interpreter, COMMAND.COM. By starting another instance of COMMAND.COM at the end of your batch file, the DOS session remains onscreen until you type EXIT. ◪

Brian Livingston is the author of Windows 3.1 Secrets *(1992), a 990-page book on undocumented Windows features, and the new* More Windows Secrets *(1993), both published by IDG Books. His column on Windows debuts in the Help section of this issue on page 378.*

Read Them And Reap.

One of the top performers in its class, the Diamond Pro 17 is a very good value.

Windows Sources
February 1993

Diamond Pro® 17 Color Monitor

The Diamond Pro 17 is packed with well-planned technology. It is one of the best choices you make for a 17-inch Windows Workstation.

PC Sources
October 1992

3 YEAR WARRANTY
Parts and labor.
Protected investment with guaranteed lower cost of ownership.
3

A high resolution 17-inch color monitor beats the cramped 14-inch variety for running Windows, and Mitsubishi's Diamond Pro 17 is a truly exceptional one.

PC Computing
September 1992

The Diamond Pro 17 has more going for it than just a large display. It's built around an intelligent microprocessor that lets it adapt to input from almost any computer video source. Overall, this monitor is an excellent choice for desktop publishing.

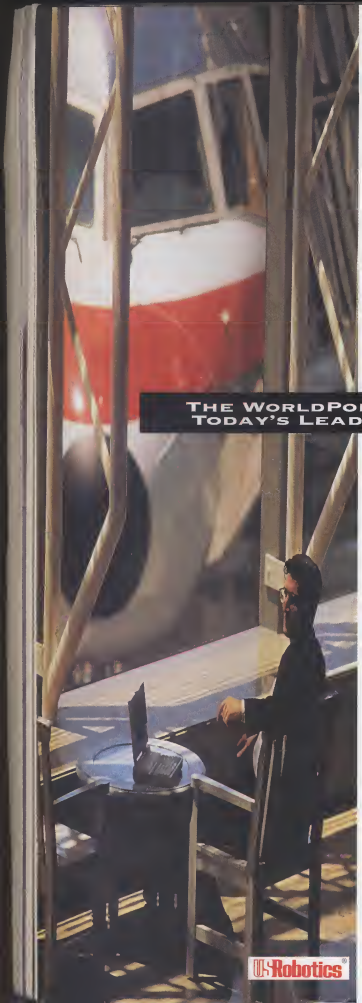
WordPerfect For Windows
February 1993

For more information or complete reviews call 1-800-843-2515, or write to Mitsubishi Electronics America, Inc., Display Products, 5665 Plaza Drive, P.O. Box 6007, Cypress, CA 90630. In Canada write Mitsubishi Electric Sales Canada, Inc., 4299 14th Avenue, Markham, Ontario L3R 0J2.

MITSUBISHI
DISPLAY PRODUCTS

©1993 Mitsubishi Electronics America, Inc. Diamond Pro is a registered trademark of Mitsubishi Electronics America, Inc. Screen image produced from Modern Medium Inc. (RenderStar 2)

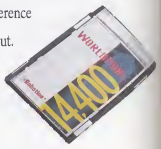
Circle 194 on reader service card.



ACCEPTED EVERY WHERE

THE WORLDPORT FAX/DATA PCMCIA MODEM. TODAY'S LEADING INTERNATIONAL CARRIER.

Whoever said travel is fun never flew around the world on business. But taking the WorldPort™ PCMCIA fax/data modem with you can make it easier. Compatible with all international standards, the WorldPort is wafer-thin and ports easily to all laptop brands. Unique features include Quick Connect, HST Cellular, Class 2 fax, and Link Security. There are no extra cords or adaptors to carry, and it's rugged, so you can rely on it to last. WorldPort PCMCIA delivers the reliability, compatibility, and ease of use you would expect from a U.S. Robotics product. And that can mean the difference between making contact or missing out. For more information on PCMCIA 14,400, call toll-free: 1-800-DIAL-USR



WORLDPORT™

The Standard in PCMCIA Communications

U.S. Robotics, Inc., 8100 N. McCormick Blvd., Skokie, IL 60076 (708) 982-5010

U.S. Robotics and the USRobotics logo are registered trademarks of U.S. Robotics, Inc.
All brand or product names are trademarks or registered trademarks of their respective companies.

Circle 164 on reader service card.

U.S. Robotics®

PC POWER. PERFORMANCE. PRODUCTIVITY.

PC Computing

PC Computing

PROFESSIONAL DISCOUNT ORDER FORM

ANNUAL COVER PRICE	REGULAR SUBSCRIPTION PRICE	YOUR PROFESSIONAL ONE-YEAR RATE	BONUS STATUS
$35.40	$24.97	$14.97	FREE 1001 PC HINTS & TIPS 2-DISK SET

As a professional involved with computers, you are entitled to a reduced rate on PC/COMPUTING. Return this form to receive PC/COMPUTING for up to 62% off the newsstand price. BONUS: 1001 PC Hints & Tips disks -- FREE with your paid subscription.

Check one:
☐ 1 year (12 issues) for $14.97—SAVE 58%
☐ 2 years (24 issues) for $26.97—SAVE 62%

Name (Please Print) 4SCU1

Company

Address

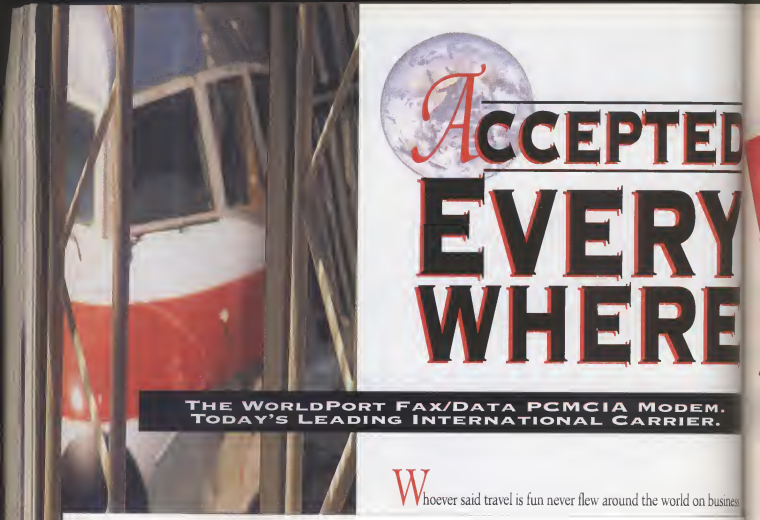
City State Zip

REPLY REQUESTED

☐ Payment enclosed. ☐ Bill me later.

RETURN THIS FORM TO GUARANTEE SAVINGS.

Basic one-year subscription $24.97; on newsstands $35.40. Canada and foreign add $16.00 per year. U.S. funds only. Canadian GST Included. Please allow 30 days for shipment of first issue. FREE disks will be sent upon payment.



NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 66 BOULDER, CO

POSTAGE WILL BE PAID BY ADDRESSEE

PC Computing

P.O. Box 50253
Boulder, CO 80321-0253

PC POWER. PERFORMANCE. PRODUCTIVITY.

PC Computing

Subscribe now and save up to 62% off the cover price. Plus get FREE efficiency-enhancing SOFTWARE!

- 12 issues for just $14.97 **SAVE 58%!**
- 24 issues for just $26.97 **SAVE 62%!**

Use the subscription savings card in this issue or

CALL NOW TOLL FREE
1-800-365-2770

PERFECTLY PORTABLE PCs

486 power packed into less than four pounds means smaller keyboards, colorless displays, and short battery life. Can you live with these trade-offs?

BY MARTY JEROME

It hurts. The pain—sharp at your lower neck, a nagging throb across shoulders and back—has given you the gait of a Bowery wino. And you still have three cities to visit. Why did you even bother to bring your notebook PC along? To fetch your e-mail? To tap out a memo or patch a spreadsheet between flights?

Notebook PCs continue to gain power and functionality, but they refuse to lose bulk and weight. Truth is, they've become desktop PC replacements, not traveling machines. For almost three years now, their bottom-line heft—6 to 7 pounds without recharger, cables, and other accessories—hasn't budged. Meanwhile, smaller, 4-pound subnotebook PCs have struggled in fits and starts to replace notebooks as the mobile computing standard.

Finally they're succeeding. The first truly usable generation of subnotebook PCs has arrived. Consider today's standard model:

- 20MHz 486SLC to 50MHz 486SLC2
- 80MB to 170MB hard drive
- Backlit 64-color grayscale VGA display
- Keyboard on which you can touch-type
- Built-in pointing device
- PCMCIA Type II slot
- 7-by-10-by-1½-inch form factor
- 4 pounds or less system weight

PHOTOGRAPHY BY ERIC FREELANDER

PC COMPUTING

A combination of subtle innovation and hard compromise makes this magic possible. Improved power-management features and ever-shrinking components, such as hard drives and power supplies, let manufacturers pack more functionality into less space. But subnotebook compromises aren't trivial: Smaller displays and keyboards, lack of internal diskette drives, and shorter battery life are the price you pay to accommodate the advancements.

Given all the trade-offs, are these pint-sized portables actually usable? To answer that question we tested six 486-based subnotebooks that feature backlit displays and weigh no more than 4 pounds. The computer users we brought into *PC/Computing*'s Usability Labs evaluated the keyboards, displays, pointing devices, footprint, and how easy it is to configure the subnotebooks. We distilled these ratings to a single number, and the five subnotebooks scoring 80 or better received our usability seal. Our durability tests, which subjected the subnotebooks to a series of drops, revealed which ones will survive when it isn't a smooth trip.

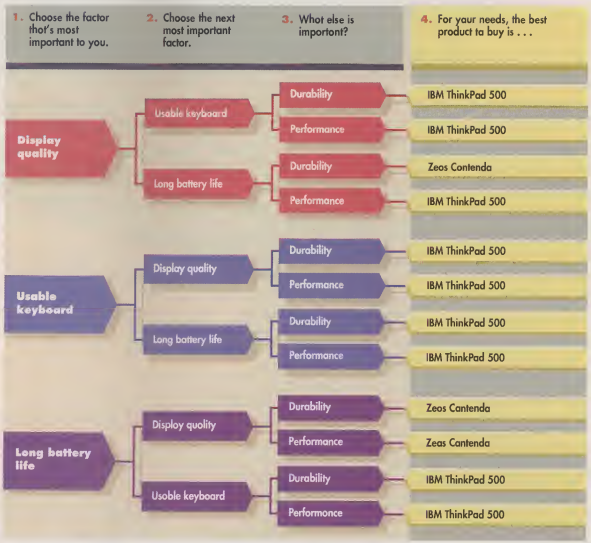
Our usability testers found that subnotebooks do take some getting used to. Your eyes must adjust to tiny displays. Your fingers must adapt to minikeyboards. And your patience must reconcile itself to shorter battery life.

WHAT YOU SEE

Ah, but persistence pays off. Discerning toolbar icons on a 7½-inch display, for example, isn't as bad as it first seems, thanks to the 0.23mm dot pitch most subnotebook displays now use. Five of the six subnotebooks we tested

PC/COMPUTING DECISION MAKER

Choose the subnotebook that won't let you down.



PC Computing BEST

IBM'S CHIEF ROAD WARRIOR

ThinkPad 500 delivers big performance and usability.

Sure, it's sleek, it's fast, and its battery goes and goes. But IBM's ThinkPad 500 will win your heart for outstanding ergonomics: a full 3mm key travel and the now-famous TrackPoint II pointing device. And you can bid good riddance to your AC adapter once and for all. The ThinkPad 500 even offers a 170MB hard-drive option, supports simultaneous VGA, and includes a PCMCIA Type II slot. All this functionality in a 3.8-pound system? Maybe it's time to give your 7-pound notebook the boot.

ThinkPad 500 • $1,999 • IBM • 1133 Westchester Ave., White Plains, NY 10604 • (800) 772-2227
Circle No. 679 on Reader Service Card

have 7½-inch displays. Only the Dauphin DTR-1 comes with a smaller, 6-inch display, which our usability testers found to be inadequate for working comfortably in a GUI. Subnotebooks with 8- and 9-inch backlit displays are on the way, but the trade-off for the increased real estate will be shorter battery life and more weight.

Even with bright VGA, you're simply going to have to forgo certain applications when using these reduced displays. Forget presentation graphics and desktop publishing, at least until color subnotebooks arrive. Expect to see the first color models by next month (see "Faster, Lighter, Colorful Subnotebooks," page 311). While you're waiting for easy-on-the-eyes color, you can make a 7½-inch monochrome display more readable using sans serif screen fonts and zooming your view to 200 percent.

WHAT YOU TOUCH

There's less you can do to improve a small keyboard—except adapt to its compromises. Subnotebook manufacturers have found that keyboards can shrink to no less than 90 percent of a conventional keyboard's size. Any smaller and touch typists throw up their hands. Even at 90 percent, typos fill the screen until your fingers adjust to the compact console.

In addition to overall size, the distance from key center to key center determines just how comfortably you can type. Five of the six subnotebooks we tested space their keys at 17.5mm, compared with 19mm on a standard notebook keyboard. The Dauphin DTR-1 spaces keys at 16mm. Our Usability Labs testing showed that although the Dauphin's keyboard took longer to adapt to, it's not impossible to use.

We also found that key travel—the distance the key moves when pressed—plays a bigger role in keyboard satisfaction than previously believed. Despite flaws in keyboard layout, for example, the IBM ThinkPad 500 and Zeos Contenda drew kudos for their full 3mm travel, which is typical of full-sized notebooks (by comparison, most desktop PCs have a 5mm travel). Key travel on the four other subnotebooks is 2.5mm, which may seem like a slight difference, but experienced typists will definitely notice the discrepancy.

Cursor-control placement is one area where subnotebooks still aren't up to par. The ThinkPad 500's cursor keys, situated below the right Shift key, are one-third the size of QWERTY keys and very difficult to use. The Compudyne, Epson, and Twinhead models at least have full-sized keys, but they're located below the Enter key. The Contenda cursor controls line up in a row in the lower-right corner—a design from the Dark Ages.

Pointing devices fare no better. IBM's now-famous TrackPoint II eraserhead pointing device takes the longest to learn, but beats the pants off the tiny trackballs used by the Compudyne, Epson, Twinhead, and Zeos products. *PC/Computing*'s Usability Labs testers also gave high marks to the Dauphin DTR-1's cordless stylus. Even if you don't give a wit about pen computing, a stylus provides an excellent way to navigate Windows menus.

HOW LONG YOU LAST

All this resplendent functionality won't do a bit of good if the batteries die two hours into a flight. None of the subnotebooks we tested will get you from Los Angeles to New York. The Contenda—at 2 hours and 43 minutes with all power-management features disabled—bested the others by anywhere from more than 30 minutes to nearly an hour.

You also want the flexibility of expansion options. Need hard copy of a document? Fax it to yourself via modem, send it to the print server via a PCMCIA Ethernet card, or hook up to the hotel's LaserJet II. Along with parallel and serial ports, a PCMCIA Type II slot is a must. Only the Contenda and DTR-1 lacked one in our evaluation.

In addition to these capabilities, we'd like active-matrix color, six hours of battery life, and better pointing devices. These innovations will arrive as soon as next month; others are at least two years away. Meanwhile, the subnotebooks here can handle what most of us need on the road. But given the choice, we'll take the IBM ThinkPad 500.

COMPUDYNE 4SL/25 SUBNOTE

Twinhead's twin delivers same middling performance and battery life.

PC Computing USABILITY APPROVED

SCORE: 80.2

Smart keyboard design, but a poor pointing device.

THIS WELL-DESIGNED subnotebook is the same as the Twinhead SubNote 486SLC, except for its CPU. While the Compudyne version uses a 25MHz 486SL, the Twinhead model sports a 33MHz 486SLC. Despite this difference, their performance is about the same. In our tests they ranked in the middle of the pack, significantly behind the top performer, the IBM ThinkPad 500 (see "Performance," page 313). And when it comes to battery life, the Compudyne SubNote and Twinhead SubNote are again neck and neck. The Compudyne model lasted 1 hour and 28 minutes while the Twinhead lasted just 12 minutes longer.

More impressive is the design. The keyboard is luxurious for a subnotebook: crisp but short travel, full-size cursor controls, and dual Alt keys on either side of the space bar. You pay with undersized function keys and a lack of Page Up, Page Down, Home, or End keys.

The Compudyne SubNote's expandability will also surprise you. A modem can be hooked to the machine's proprietary modem slot, to its PCMCIA Type II slot, or to its standard RS-232 serial port. (But save the serial port for a pointing device that you can actually work with, such as Microsoft's BallPoint mouse.) Of course, the extra batteries are expensive ($129.99), and the design forces you to turn the system over to replace them.

Battery life is shorter than we'd like, but for meat-and-potatoes work on the road, the Compudyne SubNote won't let you down.

4SL/25 SubNote • $1,699 • Compudyne • 15167 Business Ave., Dallas, TX 75244 • (800) 932-2667, (214) 702-5600
Circle No. 676 on Reader Service Card

DAUPHIN DTR-1

A subnotebook or pen PC? Either way this innovative hybrid is too small.

USABILITY SCORE: 75.7

Usable pointing device, but too small overall.

DTR STANDS FOR *desktop replacement*, a wildly optimistic designation for Dauphin Technology's unusual subnotebook. Unlike other portables, the DTR-1 has no hinge, so the display (which includes the CPU) and keyboard are joined by a detachable cable. Because the DTR-1 is a pen-based system, you can leave the keyboard behind and take along the display and stylus.

Separating the keyboard and display makes it easier to work comfortably in cramped quarters. This flexibility, however, is undercut by the too-short cable that connects them and by passive-matrix screen technology, which forces you to view the display head-on.

But the biggest drawback of the DTR-1 is that it's simply too small. Working with Windows on its 6-inch display is the stuff migraines are made of. The keyboard—well under the 90-percent industry standard—makes touch-typing difficult. And the hard drive comes in scant 20MB and 40MB capacities.

To its credit, the DTR-1 comes with Microsoft Windows for Pen Computing and a cordless stylus that's terrific for navigating menus. It features one of the smallest battery rechargers we've seen, and tiny $89 battery replacements slip easily into the machine's side. Our test unit had an optional ethernet adapter, which we'd trade for a PCMCIA slot. The DTR-1's poor usability, plus its slow performance and short battery life (it placed last on both), make this a machine to avoid, unless your road work is very light. If so, the DTR-1's Lilliputian size might be well worth it.

Dauphin DTR-1 • $2,495 • Dauphin Technology • 377 E. Butterfield Rd., Suite 900, Lombard, IL 60148 • (800) 782-7922, (708) 971-3400
Circle No. 677 on Reader Service Card

EPSON ACTIONNOTE 4000

Long battery life, but meager performance makes it a middle-of-the-packer.

PCComputing USABILITY APPROVED

SCORE: 89.2

Best keyboard, but below-average display.

LIFT UP THE top of the ActionNote 4000 and something seems oddly familiar beneath its handsome matte gray finish. That's because the keyboard has the same design as that used for the Compudyne and Twinhead models.

This subnotebook comes with 4MB RAM, an 80MB or 120MB removable hard drive, one PCMCIA Type II slot, and a full complement of ports. Let's not pretend that the ActionNote 4000—or any of the other subnotebooks—will ever replace your desktop PC, but the ability to snap a real monitor and keyboard onto the system when you have access to them civilizes work immeasurably.

The 7½-inch display is bright with good contrast, although it's severely plagued by ghosting and submarining (the cursor disappears when you skate it across the screen too fast). Despite its 33MHz 486SLC CPU, the machine's performance was mediocre across the board. But in battery-life tests, it rated well, tying with the IBM ThinkPad 500 for second place at 2 hours and 1 minute with all power-management features disabled. When the batteries do run down, flip a side-mounted latch to easily swap for a $79 replacement.

We found port covers flimsy and easy to break. A single wide hinge connects the display to the CPU on the machine's right side, which leaves the screen susceptible to flexing and cracking. Better construction, a crisper display, and improved performance would make it a contender.

Epson ActionNote 4000 • $1,699 • Epson America • 20770 Madrona Ave., Torrance, CA 90503 • (800) 289-3776, (310) 782-0770
Circle No. 678 on Reader Service Card

IBM THINKPAD 500

Like its older brother, this subnotebook is a usability powerhouse.

PCComputing USABILITY APPROVED

SCORE: 92.6

Usability winner has best pointer and footprint.

TALK ABOUT A hard act to follow. The 7-pound ThinkPad 720C notebook won our performance tests—and our hearts (see "In Search of the Ultimate Notebook," July, page 184). We were skeptical about the compromises IBM would have to make in the 3.8-pound ThinkPad 500. Yet, it's amazing how much of the 720C's functionality and grace IBM packed into this subnotebook.

For heavy word processing, the ThinkPad 500's keyboard sings thanks to long key travel (3mm), a full-sized right Shift key that you won't confuse with the up arrow, and independent Page Up, Page Down, Home, and End keys. Unfortunately the cursor controls and function keys are small and cramped.

The ThinkPad 500 won high marks all around from our Usability Labs testers. They found that IBM's trademark TrackPoint II pointing device requires some practice, but they rated it the best of the lot.

The ThinkPad 500 showcases one of the best innovations we've seen: The battery pack recharges itself (see "The Incredible Shrinking AC Adapter," page 310). Slip it out of the machine's side, fold out the prongs, and plug it into a wall or swap it for a $99 replacement. There's no need to travel with an AC adapter again.

When it came to our battery-life tests, the ThinkPad 500 delivered 2 hours and 1 minute with all power-management features disabled. IBM gives you all of this, plus the best performance of any machine we tested. As subnotebooks go, the ThinkPad 500 is a gem.

ThinkPad 500 • $1,999 • IBM • 1133 Westchester Ave., White Plains, NY 10604 • (800) 772-2227
Circle No. 679 on Reader Service Card

TWINHEAD SUBNOTE 486SLC

Same great design and average performance as the Compudyne.

PCComputing USABILITY REPORTER

SCORE: 89.3

Keyboard design and small adapter score well.

TAKE THE SHREWD design in Compudyne's SubNote, swap out its 25MHz 486SLC processor for a 33MHz 486SLC, and you get the Twinhead SubNote 486SLC. When it comes to price and performance the two machines are almost identical. And battery life performance is no exception. The Twinhead SubNote came in third in our rundown tests, which measured the battery life available when all power-management features were disabled. It lasted 1 hour and 40 minutes.

In comparison, the Compudyne SubNote lasted 1 hour and 28 minutes, the Zeos Contenda lasted a full 2 hours and 43 minutes, both the IBM ThinkPad 500 and Epson ActionNote 4000 lasted just over 2 hours, and the Dauphin DTR-1 lasted only 1 hour and 23 minutes. Battery replacements for the Twinhead SubNote cost $110, and the design forces you to turn the machine upside down to swap them. As with the Compudyne SubNote, we'd like to see Twinhead bump its SubNote's battery life to at least two hours.

The Twinhead SubNote offers all the design benefits shared by the Compudyne version, as well as a pleasingly small battery recharger (offered as an option for the Compudyne SubNote). Also like the Compudyne SubNote, the Twinhead's pointing device is too small to be usable.

Given a choice between the Compudyne and Twinhead models, it's a toss-up. Both are average performers at a decent price.

Twinhead SubNote 486SLC • $1,695 • Twinhead Corp. • 1537 Centre Point Dr., Milpitas, CA 95035 • (800) 995-8946, (408) 945-0808
Circle No. 680 on Reader Service Card

ZEOS CONTENDA

Small and speedy, this long-lived subnotebook is a roadworthy workhorse.

PCComputing USABILITY REPORTER

SCORE: 83.5

Small footprint, and crisp display rated tops.

NOW IN ITS second generation, the Zeos Contenda accomplishes two seemingly contradictory feats: screaming fast performance and long battery life.

The Contenda beat out four of the other subnotebooks in our performance tests, coming in behind the ThinkPad 500. At the same time, its battery lasted a full 2 hours and 43 minutes in our rundown tests. Replacement batteries for the Zeos cost $99 and snap out easily from the back.

The Contenda also has one of the smallest footprints of any of the machines we tested. This forces some unfortunate compromises in the keyboard layout. Undersized Backspace and Enter keys are hard to get used to, and cursor controls are lined up in a row beneath the Shift key.

Also, our Usability Labs tests show that the tiny trackball mounted in the upper corner of the keyboard is very hard to use. Of course, we've always liked the long (3mm) key travel of the Contenda's keyboard, as well as its luxuriously large function keys.

The Contenda's small footprint doesn't force compromises in the display, which is a full 7½ inches and offers excellent brightness and contrast that was rated the best of the six contenders by our usability testers. There's no PCMCIA slot or external keyboard adapter, and the battery recharger is among the largest of the lot. The Contenda may not offer the functionality or refinement of the IBM ThinkPad 500, but it's fast and endures.

Zeos Contenda • $1,594 • Zeos Int'l • 1301 Industrial Blvd., Minneapolis, MN 55413 • (800) 554-5218, (612) 633-4591
Circle No. 681 on Reader Service Card

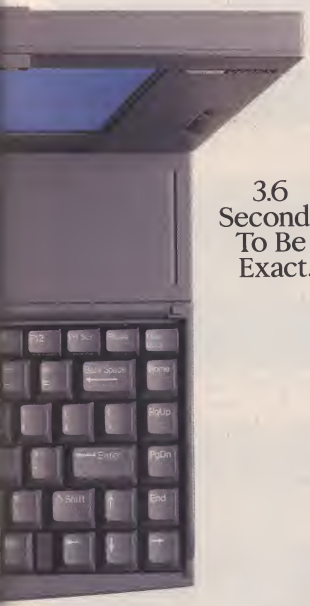
Connecting Your Notebook To The LAN Does Take A Little Time.

In a matter of seconds, Xircom can connect any notebook to any local area network anywhere.

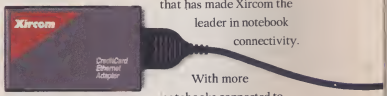
Simply slide a Xircom CreditCard LAN Adapter into your notebook's PCMCIA slot or plug a Xircom Pocket LAN Adapter into your notebook computer's parallel port.

That's it. There are no tools, batteries or AC adapters required.

It's this plug-and-play simplicity that has made Xircom the leader in notebook connectivity.



3.6 Seconds To Be Exact.



With more notebooks connected to more LANs than all other LAN adapter vendors combined.

We make a full line of Pocket and CreditCard adapters for local, remote and cordless notebook-to-LAN connections. All backed by a two-year warranty and a lifetime, half-price upgrade policy.

Call 1-800-874-7875 ext. 24J for the name of a Xircom dealer near you. And get your notebook on your LAN.

Fast.

Xircom

The easiest way to go from notebook to network.

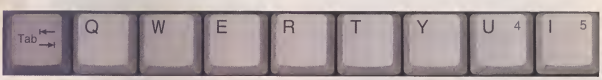
Xircom U.S. Headquarters: 818-878-7600.
Xircom Europe NV: +32/(0) 3.326.34.94
Xircom Asia: 011-852-525-2078. ©1993 Xircom, Inc.

Circle 264 on reader service card.

The Keys to Your Heart

The true test of subnotebook usability? Let your fingers do the walking.

Flying fingers have to adapt to the close quarters of subnotebook keyboards (shown life-size here), but even the tiny Dauphin DTR-1's keyboard is usable with practice. Best layout design goes to the Compudyne, Epson, and Twinhead models, which use the same keyboard with 17.5mm spacing and 2.5mm travel.



COMPUDYNE: Users liked this keyboard design, except for the undersized Shift key.

DAUPHIN: The smallest of the bunch with 16mm spacing and 2.5mm key travel.

EPSON: Rated tops by testers, thanks to a stiffer throw than the Compudyne and Twinhead models.

IBM: Winning second place, due to undersized function keys and cursor controls.

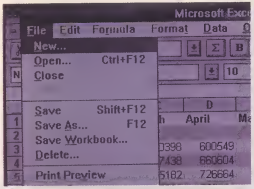
TWINHEAD: Same design as the winning Epson, but not the same winning feel.

ZEOS: Testers ranked the Contenda last because of awkward cursor key placement—despite its 3mm key travel.

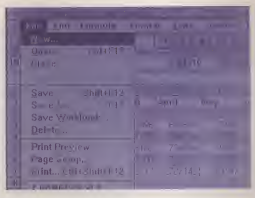
The Eyes Have It

Nothing's black and white when it comes to subnotebook displays—just gray.

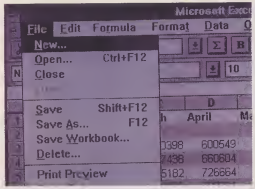
They're not much to look at, but these subnotebook displays are bright and crisp across the board. Icons and toolbars are difficult to discern—and you can forget intensive graphics work altogether. Only the Dauphin DTR-1 uses a display smaller than the 7½-inch (diagonal) screen that has become the subnotebook standard.



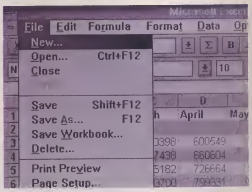
COMPUDYNE: In evaluating this average display, usability testers ranked it comparable to the others.



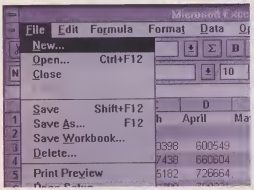
DAUPHIN: Voted the worst of the bunch, thanks to a 6-inch display that makes Windows painful.



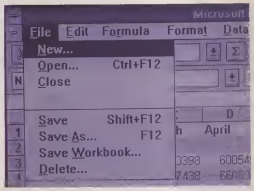
EPSON: This display was rated below par by users because of ghasting and cursor submorining.



IBM: A display as good as the rest, but for the ThinkPad we'd like to see it a bit crisper.



TWINHEAD: Like its double, the Compudyne, this display was rated adequate by testers.



ZEOS: Rated tops—just by a hair—usability testers liked the bright display of the Contendo.

Get to the Point

Pointing devices are generally awful, but testers gave two innovations a big hand.

IBM's now-famous TrackPoint II beats tiny trackballs hands dawn. Using it takes practice, but it daesn't take the motor skills of a surgeon. Look for clones of this device on subnotebooks before year end. If you opt for a subnotebook with a minuscule trackball, be prepared to shell out more for a pointing device you can actually use.

COMPUDYNE: Usability testers panned the SubNote trackball's side-mounted control buttons.

DAUPHIN: This cordless stylus was a big hit with testers. Notes one, "Very accurate for selecting."

EPSON: Easily accessible control buttons like these were preferred over side-mounted ones.

IBM: Testers liked the IBM's TrackPoint II the best, but admit it took some getting used to.

TWINHEAD: Same trackball as Compudyne's, but side-mounted buttons allowed a lighter touch.

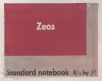
ZEOS: Control buttons were easy to get to, but testers found them to be too small for comfort.

The Surprise with Size

Subnotebooks are all about small footprints, but our testers liked bigger models best.

The true test of a subnotebook is just how comfortable it is to lug around. Surprisingly, our usability testers found the IBM ThinkPad 500 to be the most easily portable, beating out the smaller Zeos Contenda and even the tiny Dauphin DTR-1. Similarly sized subnotebooks, the Compudyne 4SL/25 SubNote, Twinhead SubNote 486SLC, and Epson ActionNote 4000, were also highly rated by our usability testers.

The Zeos's shorter front-to-back depth was highly rated by usability testers, while the Dauphin—which has a smaller footprint—was found to be more cumbersome because you need its carrying case to lug it around.



ZEOS: 9¾ by 6 by 1¾

DAUPHIN: 8⅞ by 5¾ by 1¾ (with case: 10¼ by 6¼ by 2½)

COMPUDYNE: 10 by 7 1/16 by 1¾

TWINHEAD: 10 by 7 1/16 by 1¾

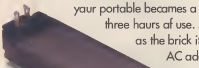
IBM: 10 by 7 3/16 by 1¾

EPSON: 10 by 7⅞ by 1½

The Incredible Shrinking AC Adapter

You'll get a charge out of innovations that make using batteries easier.

Tuck your subnotebook snugly in a briefcase packet and aff yau ga. Right? Wrang. Withaut an AC adapter, yaur portable becames a paperweight after three haurs af use. As big and heavy as the brick it's aften called, the AC adapter—with its tangle af cards—is the first thing mast af us want ta hurl aut the windaw. IBM has a better salutian: Ditch the brick. Although the IBM ThinkPad 500 cames with an external adapter, yau dan't need ta take it an the raad. Instead, remave the nickel metal-hydride battery fram the subnatebook, flip aut twa AC wall prangs, and plug it directly inta a wall sacket. The recharger is built directly inta the battery. IBM licensed this technalagy fram Western Digital. It shauld be appearing nat anly in ather portable PCs, but in camcarders, cellular phanes, and ather cansumer devices as well by next year.



The IBM ThinkPad 500's self-charging battery plugs right into the wall.

Meanwhile, canventianal adapters continue ta shrink. The ald maxim that the smaller the AC adapter, the slawer the recharge rate isn't necessarily true thanks to madulatian pawer amplifiers and intelligent adapters. Dauphin's adapter is na bigger than a deck af cards, yet was able ta recharge the machine's battery in 2 haurs.

The Twinhead SubNate 486SLC alsa comes with a pleasingly small adapter (available as an aptian with the Campudyne 4SL/25 SubNate). The Campudyne SubNate, Zeos Cantenda, and Epson ActianNate 4000 have disappointingly large adapters.

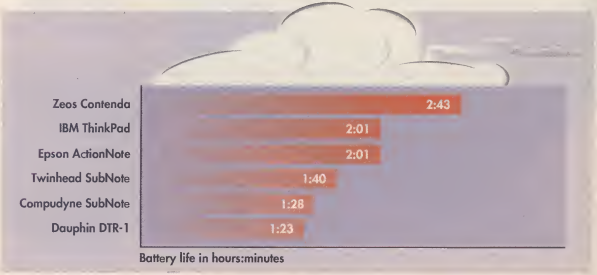
Subnatebaak manufacturers are slawly realizing that mast mabile warkers care mare abaut reducing heft and bulk than being able ta recharge batteries quickly. Few af us try ta recharge aur natebaaks while waiting for aur flight ta be called. Instead, we pap them in the hatel wall sacket avernight. A slawer charge rate is a fair price ta pay far a small AC adapter. It's a dawnright bargain far na adapter at all.

Dauphin vs. Epson AC adapters: Twice the weight doesn't mean that it charges twice as fast.

THE RUNDOWN ON BATTERY LIFE

Long life without power management puts three subnotebooks on the map.

Nane af the subnatebaaks we tested has enaugh battery life ta sustain a transcantinental flight. But in a warst-case scenaria with all pawer management features disabled, the Epsan ActianNate, IBM ThinkPad, and Zeas Cantenda have enaugh juice ta wark thraugh the in-flight movie.



Battery life in hours:minutes

Faster, Lighter, Colorful Subnotebooks

No more compromises. New portables will have it all, including long battery life.

You want color in your subnotebook? Pentium power? "Why, you can have these," says the devil grinning broadly. But what are you willing to give up? For every new capability you pack into a subnotebook's sleek form factor, something has to go. At least, that's the way things are today. But no-compromise subnotebooks will arrive sooner than you think.

CPU POWER

What you need: 100MHz Pentium or Power PCs.
Current trade-offs: Battery life, overheating.
Future solutions: Virtually all 486 CPUs now use battery-saving 3.3-volt technology. Intel plans to introduce a 3.3-volt Pentium in the first half of next year. Likewise, Motorola will offer its 3.3-volt MPC603 Power PC chip in early 1994. (Current Pentiums and Power PCs are 5 volts.) Meanwhile, look for cooler-running CPUs.

DISPLAY

What you need: 8-to-9½-inch active-matrix or dual-scan passive-matrix color displays.
Current trade-offs: Battery life and weight.
Future solutions: Four-pound color subnotebooks will be here before year end. The question is, will they yield more than two hours of battery life? Because each pixel has its own transistor, energy consumption on active- and passive-matrix screens is about the same overall—the bigger the screen, the more battery life consumed. New display technology under development, like ferroelectric and field emission, will lower costs and improve subnotebook display quality. But they will not save battery life. For at least the next five years, energy savings will have to come from other subnotebook components.

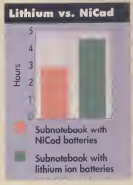
WEIGHT

What you need: Three pounds or less.
Current trade-offs: Backlighting, battery life.
Future solutions: Carbon-fiber cases and increased use of application-specific integrated circuits help pare down subnotebook weight, slightly. But substantial savings will come from giving your hard drive the heave-ho. HP's 386-based OmniBook 300 puts Windows and a suite of applications in ROM, saving 70MB or so of hard drive space. In turn, you can get by with a smaller, lighter, conventional hard drive, such as the amazing 2-ounce Kittyhawk from HP for data files (used in the Dauphin DTR-1). Or you can use solid-state storage such as flash cards.

Flash cards are faster, less fallible, and consume far less battery life than mechanical hard drives. And they weigh only a few ounces. The trouble is, they're still expensive. The 2.9-pound OmniBook 300 also sacrifices backlighting to deliver long battery life. New battery technologies coupled with flash card storage will lighten the load *and* provide backlit displays.

BATTERY LIFE

What you need: Six hours of continuous battery life (and all of the preceding features).
Current trade-offs: Weight.
Future solutions: Lithium ion batteries provide two to three times the energy density per volume than nickel metal-hydride technology—but they cost nearly twice as much per watt hour. Unlike traditional NiCads, lithium ion batteries don't suffer a "memory effect," which prevents you from completely recharging them. Nor do they contain heavy toxic metals. But they're not perfect: Overcharging liquid lithium can cause batteries to explode. Toshiba, Sony, and Valence Technology, among other companies, are exploring mechanisms to prevent overcharging (Sony already sells a lithium ion-powered camcorder in Japan). Subnotebooks with lithium ion batteries will appear before year end. They own the forseeable future of portable PCs.



SVELTE TRAVELING COMPANIONS

Features, expandability, and durability determine your perfect subnotebook.

	Compudyne 4SL/25 SubNote	Dauphin DTR-1	Epson ActionNote 4000	IBM ThinkPad 500
Phone	(800) 932-2667	(800) 782-7922	(800) 289-3776	(800) 772-2227
Reader service no.	676	677	678	679
Price	$1,699	$2,495	$1,949	$1,999
FEATURES				
Processor	25MHz 486SL	25MHz 486SLC	33MHz 486SLC	50MHz 486SLC2
RAM (max./min.)	20MB/4MB	6MB/4MB	8MB/4MB	12MB/4MB
Storage (max./min.)	120MB/80MB	40MB/20MB	120MB/80MB	170MB/85MB
Expandability	Modem port, PS/2 keyboard port, serial port, PCMCIA Type II slot, VGA adapter.	Modem port, PS/2 keyboard port, parallel port, serial port, VGA adapter, IDE adapter.	PS/2 keyboard port, parallel port, serial port, PCMCIA Type II slot, VGA adapter.	PS/2 keyboard port, parallel port, serial port, PCMCIA Type II slot, VGA adapter.
System weight	4.08 pounds	2.50 pounds	3.85 pounds	3.80 pounds
External drive weight	0.95 pounds	0.69 pounds	0.88 pounds	0.78 pounds
AC adapter weight	1.59 pounds	0.44 pounds	0.96 pounds	0.85 pounds
SUMMARY				
Durability results	Backlighting circuitry died; it still runs, but you can't see the display.	Unable to attach keyboard because port caved in; minor case damage.	No permanent damage; latch holding removable hard drive flung open.	Only damage would be lost data—it rebooted or turned off after each fall.
Pros	Excellent keyboard design; great expandability.	Amazing expandability given its size; doubles as a pen PC.	Usable keyboard; good battery life; good expandability.	Blazing performance; long battery life; great usability.
Cons	AC adapter is too big; short battery life; lousy pointing device.	Display and keyboard are too small; poor performance.	Lackadaisical performer; display plagued by ghosting.	Cursor keys are too small; display could be crisper.
Verdict	Average performer at a decent price.	Innovative design that just doesn't work.	A great price would make it worth consideration.	Yes, yes, it's a star.

HOW MUCH IS TOO MUCH?

Subnotebooks mean compromises, but they're ones we'll gladly live with.

Few of us run AutoCAD at 35,000 feet, but even word processors and spreadsheets require displays you can read and keyboards you can type on.

Subnotebook PCs aren't transparent technology: Your fingers will require days (perhaps weeks) to adapt to smaller key spacing. Tweaking the View and Workspace options of your key Windows applications becomes a fine art in packing the maximum information possible onto a 7½-inch display. And, with some splendid exceptions, most subnotebook pointing devices are simply useless—you'll have to find an alternative.

We like the IBM ThinkPad 500 because it requires less adaptation than any of the other subnotebooks we examined. And we like its many subtle but significant innovations—including the TrackPoint II pointing device and the battery with a built-in recharger.

Twinhead SubNote 486SLC	Zeos Contenda
(800) 995-8946	(800) 554-5218
680	681
$1,695	$1,594
33MHz 486SLC	25MHz 486SL
8MB/2MB	4MB/8MB
130MB/85MB	80MB/120MB
PS/2 keyboard port, parallel port, serial port, PCMCIA Type II slot, VGA adapter.	Parallel port, serial port, VGA adapter.
4.08 pounds	3.90 pounds
0.95 pounds	0.70 pounds
0.50 pounds	0.60 pounds
This machine's a goner! Backlighting fizzled out and the hard drive crashed.	Despite losing part covers and cracking its battery, the Contenda still ran fine.
Same great design as Compudyne, plus a smaller AC adapter.	Handy form factor; good performance; good battery life; 3mm key travel.
Short battery life; useless pointing device.	No PCMCIA slot; cursors line up in a row; useless pointing device.
A toss-up with the Compudyne.	A great deal for the price.

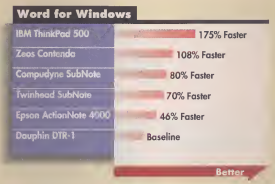
Indeed, we like the ThinkPad 500 so much, we can't wait to see the upgrade. Color subnotebooks will arrive before 1994—whether from IBM or another manufacturer. So will alternative battery technologies. Meanwhile, keyboards could stand some refinement. Displays could get bigger.

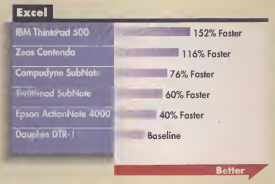
But any way you look at it, mobile computing is going to get a lot easier for all of us.

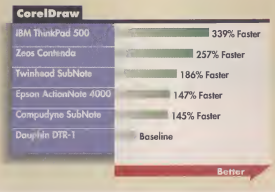
PERFORMANCE

Two subnotebooks deliver Windows muscle.

IBM's clock-doubled 486SLC2 processor pushed the ThinkPad 500 past every other subnotebook we tested. The Zeos Contenda's 25MHz 486SL coupled with a math coprocessor accounted for its admirable performance. Neither machine will disappoint.







NOW THE ADVAN
ARE EASIER THA

*1993 Lotus Development Corporation, 55 Cambridge Parkway Cambridge MA 02142. All rights reserved. Lotus and SmartIcons are registered trademarks and Lotus Organizer and Group Pack are trademarks
UNIX System Laboratories, Inc. OS/2 is a registered trademark of International Business Machines Corporation. Mac is a registered tradema

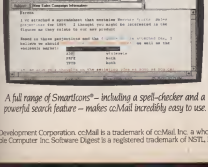
TAGES OF cc:MAIL
N EVER TO GRASP.

EVERYTHING YOU NEED TO GET YOUR BUSINESS, OR WORK GROUP, UP AND RUNNING ON cc:MAIL IN ONE BOX.

If you thought e-mail was out of your reach, think again. Introducing the Lotus® ccMail Group Pack™ for Windows.™ A complete e-mail system, including licenses for 10 users, that's not only easy to buy, but easy to install and use.

RULE-BASED ARCHITECTURE GIVES YOU COMPLETE CONTROL.

The ccMail Group Pack includes both DOS and Windows versions of the world's most popular e-mail system. With Windows ccMail's advanced rule editor will filter your mail according to priorities you designate. Furthermore, it will reroute or file incoming mail,



A full range of SmartIcons® – including a spell-checker and a powerful search feature – makes cc:Mail incredibly easy to use.

and handle outgoing messages per specific criteria set by you. And with a user friendly interface, including spell-checker, and flexible search options, anyone can feel comfortable commanding this powerful e-mail system.

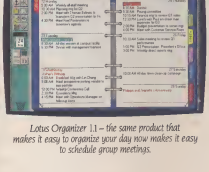
IT DOES FAR MORE THAN DELIVER YOUR MAIL.

ccMail Group Pack also includes the new Lotus Organizer™ 1.1 for Windows. This top-rated Personal Information Manager has been designed to automatically perform group scheduling for you. A task which used to take hours now takes minutes. Just enter a suggested time for a group meeting and ccMail™ will consult your co-workers' schedules and tell you if they're available. And it does this without revealing personal schedules.

And ccMail is designed to grow effortlessly as you do. Easily accommodating as many users as you have, across as many platforms as you use . . . DOS, Mac,® Windows, OS/2,® and UNIX.®

IT ALL ADDS UP.

Now you can get started with the most advanced e-mail available. The system rated easiest to learn and use by the National Software Testing Laboratory. With the Group Pack you get the full-featured, unabridged version of the



Lotus Organizer 1.1 – the same product that makes it easy to organize your day now makes it easy to schedule group meetings.

Fortune 500 standard in e-mail. It also includes licenses for 10 users and the new Organizer 1.1 for Windows. All in one box. And all at a very affordable price.

Lotus now puts the power of the e-mail system well within everyone's reach. The ccMail Group Pack. Pick it up at your Lotus Reseller. Or call **1-800-448-2500** for more information.

Lotus. cc:MAIL
E-MAIL FOR WINDOWS

otus Development Corporation. ccMail is a trademark of ccMail, Inc. a wholly-owned subsidary of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. UNIX is a registered trademark of
f Apple Computer Inc. Software Digest is a registered trademark of NSTL, Inc. a McGraw-Hill Company in Canada; call **1-800-GO-LOTUS**.

So many features, so little time. Now power and automation make Word 6.0 . . .

The Best

BY SCOT FINNIE AND ED BOTT

You threw away your typewriter back when Bill Gates was merely a millionaire and the 286 was the hottest CPU on the street. But the ghost of that clattering mechanical beast lives on in the word processor you use every day.

Most of us still treat our word processors like glorified typewriters. We pound text onto the screen as fast as our fingers can dance across the keys. Yes, we use the backspace key, and occasionally we cut a sentence from here and paste it there. If there's time, we add a dash of boldface or italic for emphasis. An adventurous few of us actually run a spell-checker before we hit the Print icon. But most of us never use more than a fraction of the immense potential in today's leading word processors because that power is trapped behind intimidating, unfamiliar interfaces.

Listen carefully: Your word processor is not a typewriter. Used fully, it's an intelligent collaborator in putting ideas on paper. Now there's finally a word processor that makes it easy, almost inevitable, to access that power.

Thankfully, the new Word for Windows is not packed with new features. Instead, it's filled to the brim with usability improvements and one-button shortcuts to powerful capabilities that have been part of the program for years. Microsoft skipped from Version 2.0 straight to 6.0 with this release of Word, ostensibly to keep pace with the DOS and Macintosh versions of Word. But the big leap in numbering is appropriate for another reason: This Word is light-years ahead of any Word you've ever seen. And until the competition catches up—next month or next year—it's arguably the most usable word processor you can buy.

SIMPLY POWERFUL

What's new in Word 6.0 for Windows? Countless little improvements and a handful of really big ones. The biggest new feature is its ability to power through complicated tasks with push-button simplicity. If you can do it with a word processor, this word processor can do it automatically, thanks to AutoFormat, AutoCorrect, and a handful of other Auto features.

Then there's the small stuff. The longer you stare at the Word 6.0 screen, the more new elements you'll see: multiple toolbars with colorful icons, a redesigned ruler and status bar, completely revamped dialog boxes, and (at long last) a multiple document interface (MDI) that lets you reduce each open window to an icon. Virtually every dialog box and function has been

Word Yet

```
M E M O
To:   David Lesby
From: Woody Mills
Re:   Proposed 3Q Production Increase

David:
Foster's 20% expenditure reduction forced us to reduce stock to just one month.

Fastest Ways to Raise 3Q Production
1. Pull from our "remanufactured" stock.
                    - Would increase returns and cut our QA rating.
2.  Subcontract some of our production to Neo-Built.
    - Would expose our design.
3. Place special orders with suppliers and increase overtime.
                    - Would incur steep costs.

Problem
Raising production in 3Q would be costly and inefficient. Drawbacks:
*          Boosting 3Q production will increase expenditures by 20%
*          Boosting 3Q production will reduce 4Q production by 15%.
*                    Customer orders for 4Q are the highest for the year.
```

E-mail look like garbage? Feor not. Word 6.0's revolutionory AutoFormot will quickly clean up your document.

Microsoft Word - C:\DOCUMNTS\WORD-6\EMAIL.DOC

File Edit View Insert Format Tools Table Window Help

David:

Foster's 20% expenditure reduction forced us to reduce stock to just one month. If we raise production now, we'll have less capacity next quarter — when our customer orders are the highest for the year.

Fastest Ways to Raise 3Q Production

1. **Pull from our "remanufactured" stock.**
   - *Would increase returns and cut our QA rating.*
2. **Subcontract some of our production to Neo-Built.**
   - *Would expose our design.*
3. **Place special orders with suppliers and increase overtime.**
   - *Would incur steep costs.*

Problem

Raising production in 3Q would be costly an

- Boosting 3Q production will increase expe
- Boosting 3Q production will reduce 4Q pr
- Customer orders for 4Q are the highest fo

Page 1 Sec 1 1/1 At 2.2" Ln 6 Co

Voilà! In seconds, AutoFormot tronsforms your ugly e-moil text file into o presentoble business document like this.

AutoFormat

Formatting completed. You can now:

- Accept or reject all changes.
- Review and reject individual changes.
- Choose a custom look with Style Gallery.

Accept All | Reject All | Help | Review Changes... | Style Gallery...

And there's more. When formotting is complete, you can opt to customize default settings through Style Gallery. In just one click, you con formot your document with ony of dozens of templote styles.

Why Word 6.0 for Windows Is a Wiz

30 great reasons to upgrade.

1 DOCUMENT MINIMIZING You con minimize documents into icons inside Word's applicotion window with support for the multiple document interface (MDI).

2 MULTILEVEL UNDO You get "uh-oh" control, thonks to 100 (or more) levels of Undo ond Redo.

3 IMPROVED COMPATIBILITY Look for dozens of WordPerfect compotibility features, including improved document conversion ond onimoted demos.

4 IMPROVED BACKGROUND PRINTING Get back to work literolly moments ofter you click on the Print icon with Word's background printing.

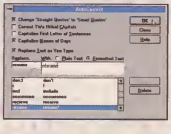
5 EDITABLE PREVIEW You con edit in Print Preview mode, ond Word gives you on up-close look ot full poges or it shows thumbnoils of on entire document.

6 WORKGROUP FEATURES You con toke odvontoge of vostly improved workgroup features, including extensive color-revision morking ond merging, plus routing thot works in conjunction with your e-moil softwore.

7 RIGHT-MOUSE SUPPORT You get context-sensitive diolog boxes thot pop up with o click of the right-mouse button when you click on toolbors, document oreas, ond other "hot" locotions.

8 ENHANCED LAYOUT MODE Get used to working in Poge Loyout View ond enjoying it becouse Word scrolls more quickly ond smoothly thon before, shows frome onchors, ond disploys heoders ond footers.

9 AUTOCORRECT No more typos! With AutoCorrect, you con customize Word to fix misspellings, mistypings, or to odd the correct accents to foreign words—oll on the fly.



10 LABELS AND ENVELOPES You con stop hond-writing your envelopes ond ochieve thot consistent, professionol look—configure ond print your speciol forms much eosier thonks to Word's significontly enhonced lobel ond envelope print settings.

11 FORMAT PAINTER You con copy chorocter formotting from one piece of text to onother. Just click on the text to copy, click on the Formot Pointer icon, then drog the new cursor to "point" the selected text with the new formot.

12 TOOLTIPS You see informotive text lobels thot pop up outomotically when you hold your cursor over on icon for o few seconds, so you'll never forget whot o porticulor toolbor button does.

13 ORGANIZER Copy styles, mocros, toolbors, ond AutoText (Glossory) items omong Word files, ond shore customizotions omong documents ond co-workers.

14 UNINSTALL Zop oll troces of the progrom or selectively remove one component of o progrom ot o time with Word's complete uninstoll routine.

15 FILE OPEN You con open o group of files simultoneously with the improved open feature.

16 MACROS You con record mocros quicker thon ever, with eosy-to-use diolog boxes ond toolbor functions.

lifted out, simplified, refined, and reinstalled to make the word processor work better as a whole. Word is the last major Microsoft application to get its own collection of Wizards (interactive online help assistants).

And Word is among the first applications to support OLE 2.0, Microsoft's new object linking and embedding standard that lets you combine multiple data types in a single document. (See "Share Data Seamlessly with OLE 2.0" on page 328.)

Is there a single "killer feature" in Microsoft Word 6.0 for Windows? No, although the one-button AutoFormat capability comes close. But taken as a whole, the wide-ranging collection of small, pleasing interface enhancements adds up to a big productivity boost. You'll find yourself experimenting with powerful features that you never realized were there because now they're a snap to use.

With this release, Word joins an elite group of applications, like Microsoft Excel and Lotus Freelance Graphics for Windows, that gauge your work activities and try to anticipate what you'll do next—or, better yet, five minutes from now. It's a sensible strategy, grounded in the realization that most of us perform the

17 TOOLBARS Word ships with 13 predefined toolbars, complete with color icons. You can customize and configure toolbars in a variety of shapes that you can place almost anywhere on the screen.

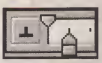
18 THREE-KEY SORTS You can easily perform three-key sorts with Word's nearly perfect sorting capabilities.

19 IMPROVED MERGE Your mail tasks are easier with Word's top-notch mail merge, which now includes extensive support for external databases, including links to Microsoft Access.

20 WIZARDS In no time at all, you can easily design fax cover sheets, calendars, agendas, and more with Word's nine Wizard templates.

21 LAYOUT FEATURES It's not QuarkXPress, but Word's rich and intuitive desktop publishing features include easy frame-handling controls, visible anchors, and options such as automated caption creation.

22 BETTER RULER You can drag both left indent settings in one smooth motion with the handle on Word's ruler.



There's also an optional vertical ruler.

23 STATUS BAR With the status bar at the bottom of the screen, you can double-click to open WordPerfect Help, launch the Macro Recorder, and lock in Extend Selection mode, which lets you select text as you move the cursor.

24 HORIZONTAL SCROLL BAR Word's scroll bar gives you built-in buttons for Normal, Outline, and Page Layout views.

25 CURSOR IN CONTEXT Word's chameleon-like I-bar text cursor now fully adapts to reflect the text it's placed in, changing in response to font attributes, including point size, superscript, and subscript.

26 INSERT SYMBOLS You can insert multiple symbols without closing automatically, and the Symbols dialog box includes a separate list of common special characters like trademark and copyright symbols.

27 COLUMNS With Word's improved Columns dialog box, you can easily configure variable-width columns. You'll also find five preset column types, each one just a click away.

28 ACCESSIBLE FONTS You can check out the fonts you've used most recently. They appear at the top of the drop-down font list on the Formatting toolbar.

29 LARGE DOCUMENTS Write your own encyclopedia! Word 6.0 handles documents up to 32MB in size, where Word 2.0 quit at a mere 16MB.

30 FIND FILES You can perform lightning-fast searches with the overhauled Find File facility that not only caches searches but also works in the background.

same monotonous tasks over and over again. And when you see how the new Word streamlines everyday word processing, you'll wonder why all software doesn't work like this.

THE ELEMENTS OF STYLE

The idea of playing Pygmalion with a plain-Jane document is hardly new. Excel for Windows and Borland's Quattro Pro for Windows have been sprucing up spreadsheets for more than a year with AutoFormat and SpeedFormat, respectively. But Word is the first word processor that does one-button, on-the-fly make-overs.

Here's what happens when you press the AutoFormat button: First, Word intelligently parses the text into headings, subheadings, body text; notes spacing, fonts, bullets, and so on; and creates style tags. Then Word lets you review its changes. Finally, it pops up a dialog box that lets you approve the changes or head straight to a gallery of predefined style sheets. Pick the look you want, and Word applies it to your document. The result is a document that looks a whole lot better than when you started.

But there's an additional, less obvious benefit to

AutoFormat. Because all the formatting changes are tied to style tags, you can selectively accept, reject, or edit the changes to the document. Even better, you can change a document's entire look by choosing another style-sheet template from the Style Gallery—including fax cover sheets, letters, résumés, or templates you create yourself.

Style Gallery offers three ways to see style sheets in its large, scrollable preview window: using the actual text in your document, using a complex example document, or using an itemized list of the selected template's style names with formatted sample text. Once you customize a template, you'll never again spend hours clicking away at the Format menu to reinvent that desired appearance.

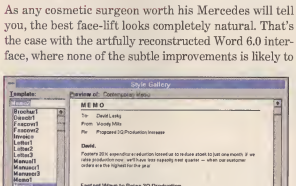
Anyone intimidated by Word 2.0's rigid approach to styles will want to check out the new Style Manager. Like Lotus's Ami Pro 3.0, Word 6.0 previews the style for you, but it goes Ami Pro one step better by using live copy. Like WordPerfect, Word 6.0 now supports character and paragraph styles. The Style dialog box itself is a superbly organized control panel; even if you never grasp the concept of styles, you'll likely find yourself using them.

Other formatting enhancements have been lifted from a variety of sources. Ami Pro's Fast Format shows up in Word 6.0 as the Format Painter. Both programs let you copy formatting from one piece of text and "paint" that formatting on to other text throughout a document. Word's new Table AutoFormat, borrowed from Excel 4.0, does for Word tables what AutoFormat does for text, complete with colorful headings.

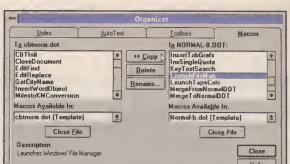
Border and shading options are dramatically richer. Bullets are more accessible. And Word finally does numbered lists right: When you insert a new item into a list, Word automatically renumbers succeeding items.

VISIBLE IMPROVEMENTS

As any cosmetic surgeon worth his Mercedes will tell you, the best face-lift looks completely natural. That's the case with the artfully reconstructed Word 6.0 interface, where none of the subtle improvements is likely to



Previewing styles is a breeze. Style Gallery shows you templated style sheets with a live or example document, or with samples of all the style tags in a template.



Shore customizations easily. Organizer lets you transport macros, styles, AutoText entries, and toolbars between any two template files locally or on the network.

jump out at you immediately. The ruler is redesigned, with a 3-D look that also extends to the new tabbed dialog boxes—a look, not coincidentally, that's exactly like Excel's. Every dialog box includes a Help button for context-sensitive reference.

Toolbars take up more screen real estate than anything else in the new Word, and they're worth it. Where Word 2.0 included a single toolbar plus a formatting Ribbon, Word 6.0 ships with 13 predefined toolbars. In addition to the standard toolbar, there are toolbars for formatting, borders, database access, drawing, and forms, plus one set of toolbars that mirrors the Word 2.0 for Windows toolbar. Five other toolbars pop up automatically in conjunction with specific operations, such as Mail Merge.

Microsoft's designers obviously studied Lotus's SmartIcons in detail, borrowing liberally and improving the interface occasionally. As with SmartIcons, you can boost the size of the tiny default icons with one mouse click. The ToolTips feature automatically pops up a bright yellow label for any toolbar button when you leave the mouse pointer poised over the icon for more than a second.

Out of the box, Word includes more than 200 color icons arranged in 11 fixed palettes that correspond to top-level menu and dialog functions. And Word has finally caught up with arch rivals WordPerfect and Ami Pro in the drag-and-drop derby: To modify a toolbar, you drag an icon from the Customize dialog box and drop it on any open toolbar. To delete an icon, just drag it off.

As with Ami Pro's SmartIcons and WordPerfect's Button Bars, you can snap Word toolbars along any edge of the screen or leave them floating. To open or close toolbars, you click the right-mouse button anywhere in any toolbar. You get a pop-up menu that lets you click on available toolbar names to toggle them open or closed.

APPLIED INTELLIGENCE

When the multimedia edition of Word 6.0 hits the streets, listen for the sound of footsteps coming out of your PC's speaker. That will be Word following a half-step behind you, cleaning up typos, misspellings, and capitalization

I Need Screaming Fast Windows!

I Want A Powerful 486 Color Notebook!

I Need A Complete Multimedia System!

Buy Direct From The Industry Source.

Acer makes PCs sold by the top computer companies in the world.

Super Fast VESA Local Bus.

Acer desktop PCs give you more than 16 times the speed of ISA with VESA local bus. VL bus connects peripherals directly to the CPU where 32 bits of data can be passed along at incredible speeds providing the perfect solution for demanding applications like full-motion video and multitasking.

Remarkable Expandability

The VL bus used in our PCs is non-proprietary and supported by hundreds of vendors, allowing you to boost the performance of nearly any application. The bus architecture is designed to support existing 16-bit ISA expansion cards.

ACER COMPUTERS • THE INDUSTRY SOURCE

Acer: A $1.5 Billion Computer Giant.

Since our start in 1976, Acer has grown to be the vendor of choice for the world's top computer companies. Some of the biggest names in the industry recognize Acer as one of the world's most quality-conscious PC manufacturers. Our attention to detail, excellent record of reliability and great value have helped us to achieve status as the world's leading OEM manufacturer. Now you can buy direct from the industry source.

1995 BYTE AWARD OF DISTINCTION

Received by the AcerPAC Multimedia System for excellent features and design.

PC WORLD BEST BUY

Received by the AcerPower 486e and notebook for the right combination of performance, price, expandability and design.

Intel Inside

The symbol of quality that only a select few can claim.

Preferred Corporate Buyer Program

Join the Preferred Corporate Buyer Program and you'll get preferential treatment—such as a dedicated account representative with a special 800 ordering number, your own service and support hotline, replacement parts in 48 hours and special lease rates.

Popular software like Microsoft Works for Windows and Productivity Pack comes pre-loaded on select Acer systems.

Talk to a Helpful Engineer 7 Days a Week/24 Hours a Day

Have a question about how to set up your system? Want to know how to get going on Microsoft Works™ for Windows? Curious about what options are available with your system? Just call us toll-free at any time of day, any day of the week and our trained professionals will be happy to help.

A Full Year Of On-Site Service

Don't worry. If you have a problem with your Acer system, we'll have a service representative out to you in 48 hours—we promise.

Express Parts Replacement

Because time is money, we will get replacement parts out in less than 72 hours.

30-Day Money-Back Guarantee

We are so sure that you'll be totally satisfied with your new Acer system that we're offering a full 30-day money-back guarantee—no questions asked.

intel inside

Now you can buy Acer direct

Also available through our fine resellers and retailers.

VISA MasterCard LEASING

AcerPower 486DX2/66

- 8MB System RAM
- 128KB Second-level Cache
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- VL Bus Accelerated VGA with 1MB DRAM-S3
- 15" SVGA .28 Non-interlaced Color Monitor
- Upgradable to Intel Pentium™ Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken® Installed
- 8 16-bit ISA Slots, 2 on VL Bus

PC WORLD BEST BUY

$2,395

AcerPower 486DX2/50

- 8MB System RAM
- 128KB Second-level Cache
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- VL Bus Accelerated VGA with 1MB DRAM-S3
- 15" SVGA .28 Non-interlaced Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 8 16-bit ISA Slots, 2 on VL Bus

The Graphics Blaster ✓

$2,195

AcerNote 750c 486SL/25

- Intel 486SL/25MHz CPU
- 4MB System RAM
- 2 PCMCIA Type II Slots/1 Type III Slot
- 9.5" Active-matrix Color Display
- 120MB Hard Disk Drive
- Palmrest with Integrated Trackball
- SmartCase™ Modular Housing
- MS-DOS® 6.0, Microsoft Windows 3.1 and Works for Windows Installed
- International Travelers Warranty
- **Monochrome Price.....$2,149**

Active-Matrix Color Display ✓

$3,695

Acer ACROS 486DX2/50

- 4MB System RAM
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- 1MB VESA Cirrus Logic Graphics Accelerator
- 14" .28 Non-interlaced SVGA Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 4 16-bit ISA Slots, 2 on VL Bus
- **128KB Cache Upgrade.....$35**

The Perfect Windows Workstation ✓

$1,795

Acer ACROS 486SX/33

- 4MB System RAM
- 240MB Hard Disk Drive
- 1.44MB Floppy Disk Drive
- 1MB VESA Cirrus Logic Graphics Accelerator
- 14" .28 Non-interlaced SVGA Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- 9600 Baud Fax Modem
- Microsoft Works for Windows, Productivity/Entertainment Packs, Quicken and Prodigy® Installed
- 4 16-bit ISA Slots
- **128KB Cache Upgrade.....$35**

Excellent Price/ Performance ✓

$1,395

Upgrade Your Monitor

For just a little extra money you can see a lot more. Take advantage of our monitor upgrade program and you can get a 15" low radiation color monitor with 1024 x 768 resolution for only $99 more. And $549 more will get you a full-featured 17" color monitor with on-screen adjustment capabilities and 1280 x 1024 resolution. After all, don't you deserve it?

$99
Additional

AcerView™ 56L 15" Color Monitor

- 15" Non-glare Flat Square Screen
- Low Radiation CRT
- Superfine 0.28mm Dot Pitch
- 1024 x 768 resolution, NI
- Intelligent Micro-control System
- Ergonomic Tilt/Swivel Base

$549
Additional

AcerView 76i 17" Color Monitor

- 17" Non-glare Flat Screen
- Superfine 0.28mm Dot Pitch
- iColor System for Color Adjustments
- Intelligent iScreen Menus
- Automatic Display Mode Switching
- 16 User-programmable Display Modes
- VGA, SVGA, XGA, VESA, and CAD/CAM Compatible
- VLMF Low Radiation Feature

Call for prices to purchase monitors separately.

Acer®

onday through Friday 6 AM-6 PM and Saturday 8 AM-4 PM Pacific Time
hen calling, please reference #113 ACD

AcerPower 486DX2/66

$2,995

- 16MB System RAM
- 256KB Second-level Cache
- 340MB Hard Disk Drive and **2X CD-ROM Drive**
- 1.44MB Floppy Disk Drive
- VL Bus Accelerated VGA with 1MB DRAM-ATI
- 15" SVGA .28 Non-interlaced Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 8 16-bit ISA Slots, 2 on VL Bus

AcerPower 486DX2/66

$2,395

- 8MB System RAM
- 128KB Second-level Cache
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- VL Bus Accelerated VGA with 1MB DRAM-S3
- 15" SVGA .28 Non-interlaced Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 8 16-bit ISA Slots, 2 on VL Bus

AcerPower 486DX2/50

$2,195

- 8MB System RAM
- 128KB Second-level Cache
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- VL Bus Accelerated VGA with 1MB DRAM-S3
- 15" SVGA .28 Non-interlaced Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 8 16-bit ISA Slots, 2 on VL Bus

Acer ACROS 486DX2/50

$1,795

- 4MB System RAM
- 340MB Hard Disk Drive
- Dual Floppy Disk Drives
- 1MB VESA Cirrus Logic Graphics Accelerator
- 14" .28 Non-interlaced SVGA Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- Microsoft Works for Windows, Productivity/ Entertainment Packs and Quicken Installed
- 4 16-bit ISA Slots, 2 on VL Bus
- **128KB Cache Upgrade.....$35**

ACER COMPUTERS • THE INDUSTRY SOURCE •

Acer ACROS 486SX/33

$1,395

- 4MB System RAM
- 240MB Hard Disk Drive
- 1.44MB Floppy Disk Drive
- 1MB VESA Cirrus Logic Graphics Accelerator
- 14" .28 Non-interlaced SVGA Color Monitor
- Upgradable to Intel Pentium Upgrade Processor
- 9600 Baud Fax Modem
- Microsoft Works for Windows, Productivity/ Entertainment Packs, Quicken and Prodigy Installed
- 4 16-bit ISA Slots
- **128KB Cache Upgrade.....$35**

AcerNote 750c 486SL/25

$3,695

- Intel 486SL/25MHz CPU
- 4MB System RAM
- 2 PCMCIA Type II Slots/1 Type III Slot
- 9.5" Active-matrix Color Display
- 120MB Hard Disk Drive
- Palmrest with Integrated Trackball
- SmartCase Modular Housing
- MS-DOS 6.0, Microsoft Windows 3.1 and Works for Windows Installed
- International Travelers Warranty

AcerNote 750 486SL/25

$2,149

- Intel 486SL/25MHz CPU
- 4MB System RAM
- 2 PCMCIA Type II Slots/1 Type III Slot
- TSTN Backlit LCD, Up to 64 Shades of Gray
- 120MB Hard Disk Drive
- Palmrest with Integrated Trackball
- SmartCase Modular Housing
- MS-DOS 6.0, Microsoft Windows 3.1 and Works for Windows Installed
- International Travelers Warranty

AcerMagic Upgrade Kit

$499

- CD-ROM Drive
- Sound Blaster and Business Audio-compatible 16-bit Sound Card
- High-performance Stereo Speakers
- Integrated 9600 Baud Fax Modem
- Super Multimedia Pack and Music Center Software
- Microsoft Multimedia Bundle—Works, Encarta, Golf, Cinemania and Soundbits
- **Pre-loaded with System Purchase Only**

Buy Direct From The Industry Source.

intel inside

Call 800-230-ACER

Monday through Friday 6 AM-6 PM and Saturday 8 AM-4 PM Pacific Time
When calling, please reference #113 ACD

VISA MasterCard EASING

Also available through our fine resellers and retailers.

Acer America Corporation • 2641 Orchard Parkway • San Jose, CA 95134 • Fax: 408-922-2953

Acer

Please call 1-800-230-ACER for details on the money-back guarantee, limited warranty and International Travelers Warranty. Return shipping and insurance charges are the responsibility of the customer. Not available in Canada. On-site service may not be available in certain remote locations. Products, availability, prices and programs are subject to change or cancellation without notice. Shipping and handling charges are extra. Acer and the Acer logo are registered trademarks and AcerNote, AcerView, ClipUp and SmartCase are trademarks of Acer America Corporation and Acer, Inc. Intel and the Intel Inside Logo are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. ©1993 Acer America Corporation. All rights reserved

errors on the fly. This occasionally unnerving feature is called AutoCorrect, and it relies on algorithms and an editable translation table to automatically clean up your writing. The default table includes a handful of ubiquitous misspellings *(recieve* instead of *receive)* and transpositions *(teh* instead of *the),* but you can also use it to expand abbreviations into common phrases.

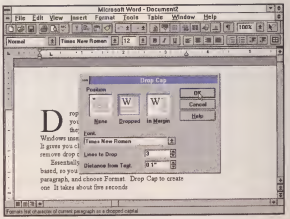
AutoCorrect swings into action every time you hit the space bar (or a period or other punctuation) after a misspelled word. You can make the feature act as a watchdog and a multilingual assistant by defining AutoCorrect entries that patch in the correct spelling of words that use special characters like accents and umlauts. Check the proper boxes on the Options dialog box, and AutoCorrect also replaces straight quotes for smart quotes. And if the whole notion of AutoCorrect gives you the heebie-jeebies, you can turn it off completely.

The Word 6.0 development team lavished attention on one of the program's tiniest features—text selection. The result is a surprising increase in efficiency. By default, Word assumes that when you swipe the mouse pointer over a word or choose a formatting option that you want to select the entire word. The result? You can click the mouse with reckless imprecision and trust that you'll select or reformat the text you intended. You can disable this feature—but you won't want to.

Word 6.0 refines drag-and-drop editing by automatically ensuring that the appropriate number of spaces are selected and inserted every time you drag and drop, ensuring that all text in both the old and new locations fits correctly. And you can finally drag text from one open document and drop it into another.

WORD PROCESSING MADE EASIER

You'll quickly run out of fingers and thumbs if you try to tally up the improvements in the new Word. How about 100 levels of Undo and Redo? Or fast background printing that keeps pace with Ami Pro? Fully editable



Drop caps are a snap. This dialog box automatically applies a drop cap according to your specifications at the top of the paragraph containing the cursor.

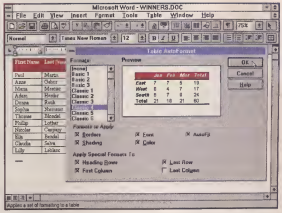


Table AutoFormat is simple. Pick from a variety of preset table styles and quickly apply all or part of their formatting to your table, just like in Microsoft Excel.

Print Preview with a thumbnail view? The ability to send documents via e-mail, complete with routing slips and revision marks or document comparisons? Database links via Microsoft Access? Shortcut menus accessible with a click of the right-mouse button?

One new feature is aimed squarely at overcoming a common objection of WordPerfect users: Click on the Help icon, then point to a block of text, and Word pops up a box of formatting information.

Need help? Word has plenty of options. In addition to the usual context-sensitive help, dozens of animated demos walk you through common business tasks. How To help (resembling the Cue Cards found in other Microsoft applications) remains visible while you work with a multistep feature. And Word's Wizards automate the creation of complex documents, such as agendas and calendars.

Merging styles and macros into other documents, which used to have an Olympian degree of difficulty, is now kids' stuff, thanks to the all-new Organizer. It lets you open two template files, including Word's default template, NORMAL.DOT, to copy, delete, or rename styles, macros, toolbars, and AutoText (called Glossary in previous versions) items between them. For many Word experts, it's an answer to their prayers.

THE FINAL WORD

So, what's not to like about Word 6.0? Not much. We've assembled a short wish list (see "In Search of Perfection" on page 329), but we had to stretch to do it. If you're already a Word user, your decision is easy: Upgrade today. If you're looking for your first Windows word processor, you can't go wrong by choosing the new Word, especially with its unbeatable WordPerfect help and file-translation capabilities. The competition—WordPerfect for Windows and Ami Pro—aren't standing still. But at least for now, this is the best Windows word processor around.

Word 2.0 vs. Word 6.0: There's No Contest

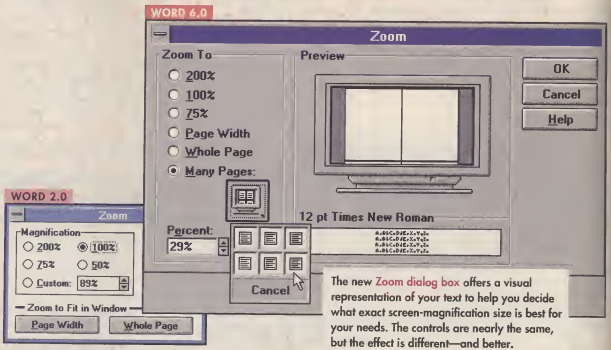
You'll find enhancements lurking in every dialog box.

Take the plunge into Word 6.0 for Windows and you'll feel like you're in a different world, especially when you compare it to Word 2.0 for Windows. Virtually nothing remains the same.

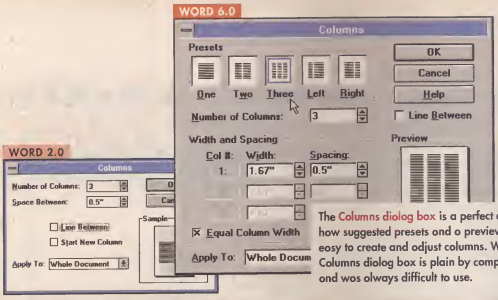
When you look at the dialog boxes in Word 6.0 you'll find that features are better organized, more accessible, and as a result, easier to use. Tabbed dialog boxes let you see and access options with just the click of a mouse. And there are *tunnels* between dialog boxes that help you avoid dead ends. For example, you can access the Replace feature from the Edit menu and the Find dialog box. Notice also the Help button on every dialog box, which provides context-sensitive assistance in times of trouble.

While Word 2.0 did provide some visual hints to determine the look of your document, it was nothing like Word 6.0, which uses live text to preview elements whenever possible. There are also visual presets, which show the most commonly used predefined options. These presets offer you choices when you need them rather than expecting you to define elements each time you use them.

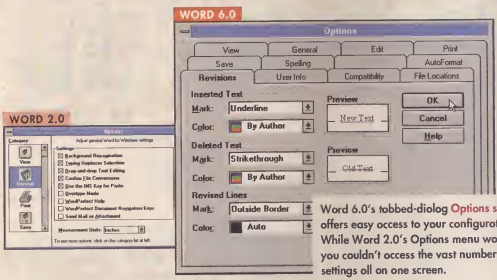
A good example of visual presets is found in the Columns dialog box, which predefines the five most common column settings from which you can choose. There are no more surprises in Word 6.0—you'll know what your document will look like before it's even finished.



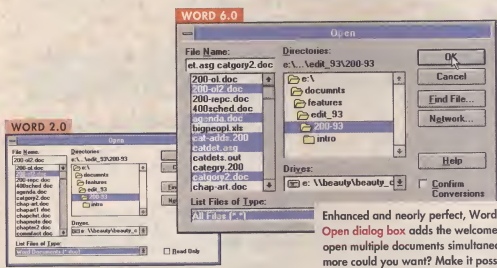
The new Zoom dialog box offers a visual representation of your text to help you decide what exact screen-magnification size is best for your needs. The controls are nearly the same, but the effect is different—and better.



The Columns diolog box is a perfect exomple of how suggested presets ond o preview make it eosy to create ond odjust columns. Word 2.0's Columns diolog box is plain by comparison, ond wos olways difficult to use.



Word 6.0's tobbed-diolog Options screen offers easy occess to your configuroticn oreos. While Word 2.0's Options menu wos colorful, you couldn't occess the vast number of options settings oll on one screen.



Enhanced and neorly perfect, Word 6.0's Open dialog box adds the welcome ability to open multiple documents simultaneously. Whot more could you want? Make it possible to set "All Files (*.*)" as o permonent defoult.

Share Data Seamlessly with OLE 2.0

It's a snap to transfer and edit data among multiple apps.

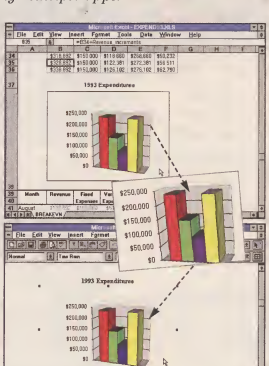
With object linking and embedding (OLE) 2.0, combining doto from multiple sources is o simple drog-ond-drop operotion.

Its predecessor, OLE 1.0, forced you to work with the electronic equivolent of scissors ond poste; to edit on embedded object (o picture in o text document, for exomple) you double-clicked on the object ond switched owoy from your originol document (the OLE *contoiner*). OLE 2.0 lets you edit on embedded object in ploce—without visibly lounching the object's originol opplicotion or opening o seporote window.

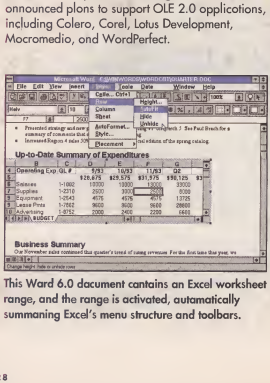
In oddition, with OLE 2.0 you con drog doto from one opplicotion ond drop it into onother to creote on embedded or linked object. During the process, the contoiner opplicotion's interfoce chonges to reflect the unique ospects of the object's notive opplicotion.

The Automotion functions of OLE 2.0 let progrommers define o set of operotions in one opplicotion ond moke them ovoilible to other opplicotions. For exomple, o word processor might beef up its toble functions by linking directly to spreodsheet formulos.

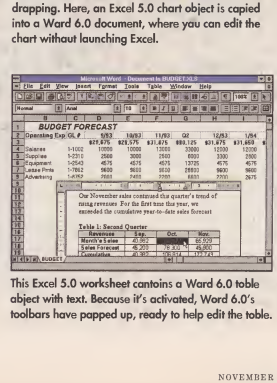
Microsoft is shipping Word 6.0, Excel 5.0, Publisher 2.0, ond Visuol Bosic 3.0 with full OLE 2.0 support. Look for support of the spec in other coming Microsoft opplicotions. More thon 30 developers ore working on ond hove onnounced plons to support OLE 2.0 opplications, including Colero, Corel, Lotus Development, Mocromedio, ond WordPerfect.



OLE 2.0 lets you link or embed an object in anather applicatian's document windaw by dragging and drapping. Here, an Excel 5.0 chart object is capied into a Word 6.0 document, where yua can edit the chart withaut launching Excel.



This Word 6.0 document cantains an Excel worksheet range, and the range is activated, autamatically summaning Excel's menu structure and toolbars.



This Excel 5.0 worksheet cantoins o Word 6.0 toble object with text. Because it's activated, Word 6.0's toolbars have papped up, ready to help edit the toble.

In Search of Perfection

Refined? You bet. But what improvements does this terrific app still need?

Is Word 6.0 for Windows the best word processor ever? Maybe. We'll reserve final judgment until next month, when we see what WordPerfect does with its Version 6.0 for Windows upgrade. In the meantime, though, we've found eight areas where Word is less than perfect, especially when compared with the latest versions of WordPerfect for Windows and Ami Pro—or, for that matter, any state-of-the-art Windows software package.

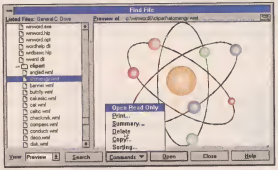
1. Built-in file management. The most effective way to manage files is to do so while you're working with them. WordPerfect recognized this long ago, and Microsoft should look at how easy WordPerfect makes it to view, find, move, and delete files. And the WordPerfect button that lets you create a directory from inside the File Save dialog box is a masterstroke that should be part of every Windows application, not just Word.

2. QuickFinder. WordPerfect hit the word processing equivalent of a home run when it built a fully indexed text search engine into its flagship program. Word (and Ami Pro) should do likewise.

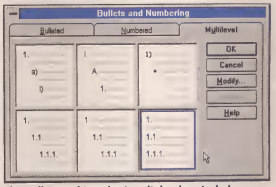
3. File Open box. Click on File Open, and Word presents a list of every file with the .DOC extension. If your file-naming habits are more creative, you'll need to jump through an extra mouse hoop every time. Oh well, at least Word, unlike Ami Pro, allows you to use alternate extensions.

4. Wizards. It should be easy to build your own or customize existing Wizards. Why doesn't Microsoft offer a Wizard's magic sack?

5. Right-mouse support. WordPerfect and Ami Pro make extensive use of the right mouse button. With Version 6.0, Word barely scratches the surface. Adding more context-sensitive menus would be a big usability improvement.



Find File now searches faster, coches searches, and lets you save and one name searches, but it's still not up to par with WordPerfect.



The Bullets and Numbering diolog box includes golleries and previews of six preset bullet and numbering types, but you can't customize defoults.

6. User-configurable defaults. It's easy to change settings in many dialog boxes, such as Bullets and Numbering, but you can't save those settings as new defaults. Users don't want to go through this tedious process every time they build a simple list.

7. Icon-creation tools. You'll want better ways to import and store icons for Word 6.0 toolbars. You can only save edited icons on a toolbar (not individually), and Word's fixed palette of 37 unassigned icons doesn't provide enough variety to cover most icon needs. Word 6.0 lacks the abilities to cut and paste icons from other icon libraries and to capture icons from the screen.

8. Screen-managing quick buttons. Application toolbars need a button that lets you close them to gain document space with a single click. The Standard toolbar should provide buttons that toggle the Ruler and Status Bar on and off to control screen real estate. And we hate scrolling: Vertical scroll bars should have inset buttons that let you click once to jump directly to the beginning or end of a document, mirroring the keyboard's Ctrl-Home and Ctrl-End functions.

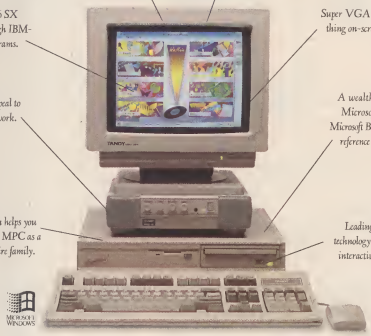
And that's it. In virtually every detail, Word for Windows 6.0 has redefined the target for usability. Will WordPerfect and Lotus stand still? Not hardly. WordPerfect 6.0 for Windows (there's that number again!) should hit the streets within weeks after Word appears. And the development team at Lotus will be taking a long look at both its rivals to see how it can jump ahead in the game of word processing leapfrog.

For now, though, Word owns the high ground.

Word 6.0 for Windows • $495 • Microsoft Corp. • 1 Microsoft Way, Redmond, WA 98052 • (800) 426-9400, (206) 882-8080
Circle No. 682 on Reader Service Card

OUR REVOLUTIONARY *new* COMPUTER *is clearly* FAMILY COMPATIBLE.

• • •



• • •

From the start, the Tandy Sensation was bound to be a family favorite. It's practical, but fun. Sophisticated, but easy to use. No wonder this Radio Shack multimedia PC has already won the hearts of so many experts. Now, though, it's your seal of approval we're after. Because we designed the Sensation with families

intel inside

The Intel Inside logo is a registered trademark of Intel Corporation. IBM is a registered trademark of IBM Corp.

And APPARENTLY, CRITIC COMPATIBLE, TOO.

"The Tandy Sensation is a rich collection of well-integrated programs and hardware in a clean, handsome package."

-Jim Canning, Michael McCarthy
InfoWorld

"It's a dandy multimedia computer. The Sensation is worth serious consideration if you're shopping for the multimedia experience."

-Larry Blasko
AP

"Tandy's Sensation is aptly named. I urge anyone looking for a good all-around MPC system to test-drive the Sensation."

-Greg Loveria
BYTE

"The Sensation is not only easy to use, but quite a multimedia Swiss Army knife."

-Selby Bateman
CD-ROM Today

"Tandy's Sensation is a state-of-the-art home computer that works well and offers a lot for the money."

-Howard Blumenthal
Hardware Review, United Feature Syndicate

"The Sensation is an excellent machine that does a lot and does all of it well."

–Eddie Huffman
Compute

like yours in mind. Its multimedia capabilities and user-friendly technology mean everyone in your home can put it to use. So why not put it

to the test? Experience the Sensation firsthand at your neighborhood Radio Shack. Chances are, you'll find it's compatible with you, too.

Radio Shack®

Circle 190 on reader service card.

Microsoft Windows, Works, Microsoft Bookshelf and Microsoft Money are registered trademarks of Microsoft Corp.

Amazing Data

In a tight field, Quattro Pro edges out its top two competitors.

If you can't do it with a spreadsheet, maybe it can't be done. Right now, halfway around the world, someone is buying or selling stocks and bonds in million-dollar blocks, based on numbers in a spreadsheet. Right now, halfway across the country, an army of Fortune 500 analysts is furiously building spreadsheet models to predict which products will be hits and which will be flops next year. Right now, in your town, a hundred small businesses are tracking their cash flow with the help of a spreadsheet. With its enormous range, from simple list management to persuasive graphics to complex financial modeling, it's no accident that the spreadsheet was the "killer application" that made the PC an overnight success.

When you rely on a tool as much as you do this Swiss Army knife of software, you need one that can handle any problem you throw at it. Choose the right spreadsheet, and it will serve you for years—or at least until the next upgrade hits the shelves.

We brought the three leading Windows spreadsheets—Borland International's Quattro Pro for Windows 5.0, Microsoft's Excel 4.0 for Windows, and Lotus Development's Lotus 1-2-3 4.0 for Windows into *PC/Computing*'s Usability Labs and tested their sharpness. When the last graph had been drawn, the last calculation completed, Quattro Pro held the winning blade. New features and brilliant usability enhancements deftly push reigning king Excel into the number-two spot. Lotus 1-2-3, although light-years better than its predecessor, proved to be a step behind the leading pair.

The latest Quattro Pro includes plenty of innovations, such as Experts to guide you through complex procedures, Tutors to teach you how to be efficient, a new workgroup desktop to facilitate data sharing, and major improvements to its already stellar graphics.

BY ROBIN J. WALDEN

PHOTOGRAPHER: HANS BOHN

Quattro Pro for Windows 5.0
Jam-packed with new features; "Tutors" help walk novices through most procedures.

$49.95 • Borland Int'l • P.O. Box 660001, Scotts Valley, CA 95067 • (800) 331-0877, (408) 431-1000
Circle No. 683 on Reader Service Card

Grazing

Excel 4.0 for Windows
A great spreadsheet for all-around use; it seems to anticipate your every move. Try the Wizards for a quick start.

$495 • Microsoft Corp. • 1 Microsoft Way, Redmond, WA 98052 • (800) 426-9400, (206) 882-8080
Circle No. 684 on Reader Service Card

Lotus 1-2-3 4.0 for Windows
Attention to usability has paid off in a vastly improved upgrade; a good choice for basic spreadsheet needs.

$495 • Lotus Development Corp. • 55 Cambridge Pkwy., Cambridge, MA 02142 • (800) 343-5414, (617) 577-8500
Circle No. 685 on Reader Service Card

Although Excel 5.0 didn't make it in time for our evaluation, we found that Excel 4.0 holds its own with shortcuts and power features that the competition still hasn't stolen, including an amazing outliner. (For an advance look at Excel 5.0, see "What It Takes to Stay on Top" on page 362.)

If you haven't seen Lotus 1-2-3 for Windows since its sorry first release, it's time to take another look. Lotus incorporated all sorts of nice touches into Lotus 1-2-3's user interface that have beefed up its usability. For example, you'll find a button on selected dialog boxes that enables you to push the box out of sight while you select a range of cells, then pop it back when you're done. In all, Release 4.0 is a great choice for basic spreadsheet work—especially if you're moving up from Lotus 1-2-3 for DOS, but it lacks the state-of-the-art analysis tools you'll find in Quattro Pro and Excel.

Finally, if you find the traditional two-dimensional spreadsheet too confining, you're not alone. In "Into the Fourth Dimension" on page 366, we review two spreadsheet hybrids that redefine data manipulation: Lotus' Improv 2.1 and Computer Associates' CA-Compete 5.0. These two multidimensional modelers make it easy for you to view, analyze, and rearrange your data.

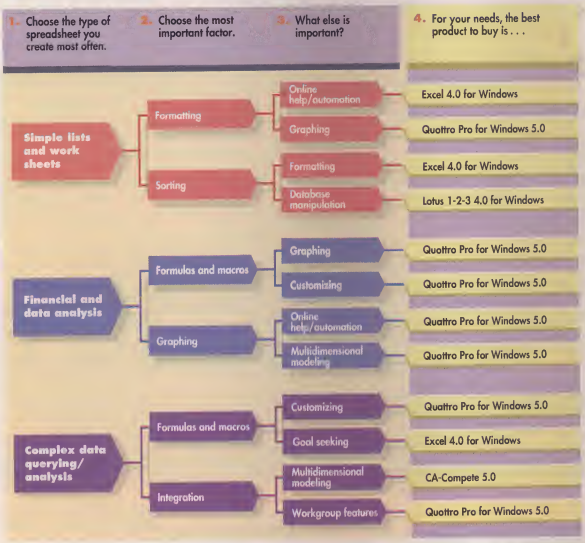
THE BOTTOM LINE ON FEATURES

Today's spreadsheets do more than just add and subtract.

	Borland International Quattro Pro For Windows 5.0	Lotus Development Lotus 1-2-3 4.0 For Windows	Microsoft Excel 4.0 for Windows	The Bottom Line
Price	$49.95	$495	$495	Quattro Pro stands out because you don't have to shell out.
Phone	(800) 331-0877	(800) 343-5414	(800) 426-9400	
Reader service no.	683	685	684	
Work-sheet structure	Bread and butter 3-D structure.	Your basic easy-to-use 3-D work sheet.	Kludgy workaround for three dimensions, but great outlining.	If you must have 3-D, then you must have Lotus 1-2-3 or Quattro Pro. For outlining, Excel's the only game in town.
Analytical tools	Exceeds Excel except in customizing.	Fairly skimpy by comparison.	Comprehensive and customizable. Unique array formula feature.	Quattro Pro has the edge, addressing more analysis tools.
Charting	The best of the bunch. Highly automatic with fine control over details.	Functional, but that's about it.	Lots of charts, lots of help, lots of control, but it's no Quattro Pro.	Quattro Pro's Experts clean up here.
Work-sheet formatting	None of the extras of the others, but table formatting is very flexible.	Great cell text control, but inflexible automatic table formatting.	Great table formatting and all the basic text formatting options.	Excel's the best on this score.
File compatibility	Best for file compatibility.	Don't use if you plan to import or export DBF files; limited file support.	Reads and writes common formats, as long as they're not graphics.	Quattro Pro can read Sumerian.
Macros and customization	Your macros are Quattro Pro's command, and you have a powerful User Interface Builder. Can't create custom @ functions.	Versatility? Sure—macros can be recorded as commands.	You can create custom functions with macros, but your dialog editor is a separate application.	Quattro Pro comes out ahead with power and an easy-to-use User Interface Builder.

PC/COMPUTING DECISION MAKER

Which spreadsheet is best for your needs?



PC Computing BEST

QUATTRO PRO FOR WINDOWS 5.0

Usable, powerful, fast, and cheap.

There's mare ta a winning spreadsheet than raws, calumns, and simple math. Quattra Pra 5.0 starts with multidimensianal taals that enable yau ta laak at data in ways yau never imagined. Mave thraugh its new, 3-D wark-sheet metaphar that makes data manipulatian a snap. Twa types af anline advisers walk yau thraugh basic and advanced features withaut making you ever apen a manual. Quattra Pra 5.0 makes it easy ta unleash its pawer and makes yau laak great by praducing impressive charts and reparts.

$49.95 • Borland Int'l • P.O. Box 660001, Scotts Valley, CA 95067 • (800) 331-0877, (408) 431-1000
Circle No. 683 on Reader Service Card

CREATING WORK SHEETS

Complex analyses can make a spreadsheet look like a 3-ring circus. Why jump through hoops to crunch a few numbers?

The days of the simple work sheet are over. Just ask anyone who's ever created a yearly budget. Fortunately, Excel 4.0 for Windows and Quattro Pro for Windows 5.0 can transform work-sheet creation from a nightmare into a pleasant dream.

Best among winner Excel's features is its powerful (and unique) outliner—a godsend for anyone who deals with hierarchical data such as budgets. Excel is also packed with handy shortcuts. For example, you can edit a range of formulas in one fell swoop. It's also the only spreadsheet that lets you sort a range by columns or rows, and it's the only one that lets you attach notes (including voice notes) to cells. Finally, Excel has a strong auditing capability that lets you trace the logic in your formulas and spot potential errors.

Excel may be powerful, but it isn't perfect. One shortcoming is its inability to create true 3-D work sheets like those in Quattro Pro and Lotus 1-2-3. True, Excel's Workbook feature lets you work with multiple spreadsheet files, but this method is clumsy.

Quattro Pro handles 3-D work sheets right: You get 256 spreadsheet pages, all stored in a single file with easy-to-manipulate tabs to ease navigation. It's also the only program that lets you compile formulas in your spreadsheets for improved speed. Sometimes we found Quattro Pro overwhelming; the menu choices are lengthy and the number of toolbars displayed can get out of control.

For basic work sheets, Lotus 1-2-3 does everything you expect, but with a few bothersome twists. For example, every work sheet starts with only one page—you must add pages as needed. That's merely annoying, but Lotus 1-2-3's group-editing mode has a more serious flaw: It inflexibly applies any changes you make to all pages in a file, unlike Excel and Quattro Pro. That means unless you lay out every page in your file identically, you may be looking at a whole lot of extra work. If you have a multipage budget file, but want a separate page for instructions or documentation, you'll find that this page takes on the formatting from the budget sheets.

Any of these spreadsheets will help you get your ducks in a row, but only Excel asks if you want them sauteed, barbecued, or baked.

		Verdict
✓	**Microsoft Excel 4.0 for Windows**	**87**
	Borland Quattro Pro for Windows 5.0	85
	Lotus 1-2-3 4.0 for Windows	73

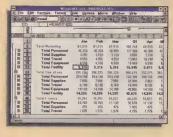
CAN'T TOUCH THIS

Excel's outliner is one feature that hasn't been copied.

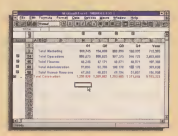
Outlining makes it easy to show just the level of detail you want. Not all data is suitable for an outline, but most budget work sheets qualify. And if you set up your formulas properly, Excel can create the outline with a single command.

Step 1
This budget is perfect for outlining. Formulas subtotal categories, subtotals roll into departments, and months group by quarters.

Step 2
Choose Outline from the Formula menu. Excel analyzes the formulas and automatically creates the outline.



Step 3
To hide extraneous details, click on the button that corresponds to the level of detail you want. Here you can see category totals.



Step 4
Collapsing works in both dimensions. In this view, even more raw details are hidden: We're showing only quarters.

FIRST WE MADE WINDOWS. NOW IT'S TIME TO TALK.

With the new Microsoft® Windows™ Sound System, just tell your computer what you want it to do. You can customize your system to respond to your personal spoken commands. Even our new directional microphone knows exactly who you are.

This full set of audio software has lots of options, too. Spice up presentations with music or quotes. Or proofread numbers as the computer reads them back.

All for the price of a game.

You can also get this software with the sound board included. So go visit your nearest reseller to see what's creating all the conversation.

Microsoft®
Making it easier

© 1993 Microsoft Corporation. All rights reserved. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation.

WE HAVE A BETTER TAPE DRIVE, AND A GREAT DEAL TO BACK IT UP.

Get a free 3M tape* with every Conner Tape•Stor Minicartridge.

From the creators of the total storage solution comes a great deal in tape storage. Now, with every Conner Tape•Stor™ 250 Minicartridge Data Backup System, you receive a free 3M DC 2120 Ximat™ Minicartridge. That's a $30 value. For Free.

Just compare that with the competition, and you'll see that Conner gives you a reliable and versatile tape drive. At a better price. With a choice of easy-to-use DOS/Windows® software. And a better warranty. Plus a free 3M minicartridge to store your valuable data. Conclusion. Conner is a better tape solution at a lower per megabyte cost than Colorado. So call **1-800-5-CONNER** for the dealer nearest you. And remember, although many may claim to give you a good deal, only Conner can back it up.

Conner Drives Right Past Colorado.

Feature	Conner Tape•Stor 250 MQT w/Backup Basics Software	Conner Tape•Stor 250 MQT Plus w/Backup Exec Software	Colorado DJ-20
Drive Size	1" Industry Standard	1" Industry Standard	NO
Free 3M Tape	YES	YES	NO
DOS/Windows Software	YES	YES	NO
2-Year Warranty	YES	YES	NO
Full Cartridge Insertion	YES	YES	NO
Suggested Retail Price	$179.99, with all the above, including a formatted 3M minicartridge	$199.99, with all the above, including a formatted 3M minicartridge	$199.99

CONNER
The Storage Answer

* Limited time offer. © 1993 Conner Peripherals, Inc. All trademarks or registered trademarks are of their respective owners.

Circle 122 on reader service card.

DATA ANALYSIS

Going crazy because you can't do a linear regression? Try a spreadsheet, not a therapist, for this kind of analysis.

Answers. That's what you expect from a spreadsheet. The spreadsheets we tested all provide sophisticated, user-friendly data-analysis tools, including linear/nonlinear solvers, goal seeking, matrix-manipulation features, and scenario management. But which is the Dalai Lama of spreadsheets? Quattro Pro for Windows 5.0.

Quattro Pro's analytical toolkit includes some 300 @ functions, from @ABS to @ZTEST. Among the scientific, mathematical, and financial functions, about the only one we couldn't find was @KITCHENSINK. It even offers online assistance along the way, in the form of its Expert-assisted analysis tools (boldly modeled after Excel's Analysis Toolpak add-in). If you regularly handle money matters, you'll flip when you see the output of the handy loan amortization scheduler. Need to peek into a database file? Launch Quattro Pro's Database Desktop and use querying tools borrowed from Borland's Paradox for Windows. Overall, it's easy to use and thoroughly impressive.

If many of Quattro Pro's analytical tools seem like déjà vu, it's because they originally appeared in Excel. Excel's analytical tools are still powerful enough for most tasks, and its implementation of array formulas remains superior to Quattro Pro's. But accessing external databases relies on Pioneer Software's Q+E add-in—a comparatively unsophisticated approach. And although Excel originated the concept of scenario management, both Lotus 1-2-3 and Quattro Pro have taken the idea and run with it.

To say that Lotus 1-2-3 is weak in terms of advanced analytical tools is stretching the point—the program just doesn't have them. But it makes a strong showing when it comes to database access. The latest release of Lotus 1-2-3 has retired the work-sheet model in favor of a top-notch new database querying method. You choose selection criteria from a dialog box, and the resulting records are placed in a special query range, which is treated as a unit.

Quattro Pro slices, dices, and purees data better than most of us ever dreamed possible. With powerful data-analysis tools that are push-button easy, Quattro Pro has all the right answers.

		Verdict
✓	**Borland Quattro Pro for Windows 5.0**	**85**
	Microsoft Excel 4.0 for Windows	78
	Lotus 1-2-3 4.0 for Windows	64

MEET THE ANALYSIS EXPERT

Borland's step-by-step adviser is sheer Wizardry.

Quattro Pro has a strong lineup of advanced analytical tools built in. But what if you're not sure how to go about a particular analysis? Call on the Experts. Borland's version of Microsoft's Wizards goes one step further in ease of use.

Step 1
The goal: Calculate a set of descriptive statistics for each exam. Don't write a formula; click an the Analysis Expert button.

Step 2
The Analysis Expert offers a scrolling list of available analysis choices. A text box offers additional info about each option.

Step 3
In the next step, fill in the blanks. After filling in the dialog box, select the Calculate button to have Quattro Pro perform the analysis.

Step 4
You'll see results in seconds. The results are formula-based, so statistics remain accurate even if you change the underlying numbers.

CHART, FORMAT, DRAW

Form over content? Never! But it can't hurt to look your best. Great graphs and formatting will get you noticed.

You want it pretty and you want it now. You want Quattro Pro for Windows 5.0, with its enviable set of charting features. True, each spreadsheet can teach the others some tricks, but Quattro Pro noses out the rest.

How do we love Quattro Pro? Let us count the ways. Probably the best feature is its graphics intelligence: Quattro Pro won't let you create a boring graph. Besides offering a dazzling array of graph types, it's the only program that uses "intelligence" to determine the best type of graph based on your data. You can format to your heart's content by relying on Quattro Pro's automatic table formatting or by overriding any of its choices. On the down side, Quattro Pro's cell formatting options aren't as strong as the competition's—for example, you can't display text vertically in a cell. And its drawing tools are comparatively weak.

Excel 4.0 for Windows, like Quattro Pro, is your right-hand man leading you down the road to looking great. Not only does the ChartWizard work magic for your data, but you also have the work-sheet formatting luxury of in-cell word wrap, although you need Excel 5.0 for multiple styles in one cell. You can even display text vertically in a cell, which can be a great space saver for complicated work sheets. And for your drawing needs, Excel bests Quattro Pro by giving you a separate drawing layer on each work sheet.

With Lotus 1-2-3, you won't find any magicians. The number of chart types is unimpressive, and you have less control than you do with Excel or Quattro Pro. Lotus 1-2-3's automatic table formatting makes too many assumptions about your table, and it's usually necessary to make manual adjustments. On the plus side, overall work-sheet formatting options abound. Not only can you display text vertically as you can in Excel, but Lotus 1-2-3 takes the next logical step, letting you align text along any angle you like. Lotus 1-2-3's unique "designer" frames can easily jazz up an otherwise forgettable table. It's still no match for the other products, though.

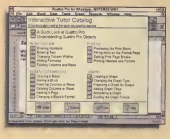
To spice up your data, turn to Quattro Pro. *You* worry about getting the data right, and *its* intelligent chart creator will take care of all the design details.

	Verdict
Borland Quattro Pro for Windows 5.0	**88**
Microsoft Excel 4.0 for Windows	86
Lotus 1-2-3 4.0 for Windows	72

CHARTING YOUR COURSE

Creating a chart in Quattro Pro for Windows is a piece of cake.

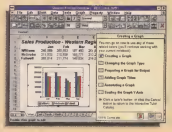
If you're unfamiliar with the fine points of charting, use Quattro Pro's interactive Tutor to get up to speed quickly. You can use your own data or sample data. Combined with Quattro Pro's Experts, the Tutors make a powerful system.



Step 1
Quattro Pro's Tutors walk you through basic spreadsheet tasks. For a lesson on graphics, choose Creating a Graph.

Step 2
The interactive Tutor window provides instructions as you go. Here's an explanation of how to select a range of data to be plotted.

Step 3
The interactive Tutor doesn't leave details to chance. When it tells you to click on the Graph Speed-Button, it highlights the button.



Step 4
After you've finished creating the graph, you can continue with other charting tutorials or return to your work sheet.

INTEGRATION

A piece of data from here, a bit from there. Before long, you've got yourself a work sheet. At least, that's the theory.

Spreadsheet data can come from anywhere. A database file, another work sheet, an online service, even—as your aching hands will testify—from the keyboard. All the programs we tested support dynamic data exchange (DDE) and object linking and embedding (OLE) 1.0 as a server and a client. But Quattro Pro for Windows 5.0 earns the McNeil/Lehrer award for its unparalleled ability to gather data from the outside world.

Quattro Pro reads and writes every essential file format, including Lotus WK1 and WK3, Excel XLS, and dBASE DBF. It also supports eight common graphics file formats. And if you're connected to a network or an e-mail system, Quattro Pro does much more. Run Borland's Workgroup Desktop, and you'll have instant access to a comprehensive application that lets you share work sheets—all at once or page by page—over a variety of networks and messaging systems.

For its part, Excel 4.0 reads and writes most common file formats, including Lotus 1-2-3, dBASE, and a variety of text file formats. And when you load a multisheet WK3 file, it converts it into a multidocument work book, stored in a single file. But the only way to get a graphics file into Excel is to copy it via the Windows Clipboard, or to insert it as an OLE object. Excel has no significant work-group features—it can't even send a work-sheet file as mail.

Lotus 1-2-3 4.0's file-importing capabilities are limited. It reads Excel 4.0 files, but it's a one-way ticket because it can't write Excel format files. It's also the only spreadsheet we tested that can't read DBF files directly. You can use either the included (but not installed by default) DataLens driver to access the DBF file directly, or use the supplied DOS application to translate the DBF file (as well as other common file formats) into a WK3 file that can then be imported into Lotus 1-2-3. On the plus side, the product is mail-enabled, so you can send mail from Lotus 1-2-3 using Lotus Notes, cc:Mail for Windows, and Microsoft Mail.

Quattro Pro is the best at gathering data from far-flung sources, and it's unmatched at sending data to the outside world. The results aren't even close: When you need to integrate and communicate, Quattro Pro gets the call.

		Verdict
✓	**Borland Quattro Pro for Windows 5.0**	**96**
	Microsoft Excel 4.0 for Windows	81
	Lotus 1-2-3 4.0 for Windows	73

WORKGROUP DESKTOP

Come together and work better with Quattro Pro.

Quattro Pro's unique Workgroup Desktop makes workgroup tasks such as sharing files and using remote mail services almost seamless. Neither Excel 4.0 nor Lotus 1-2-3 4.0 was able to match Quattro Pro's network savvy.

Step 1
The Workgroup Desktop lets you exchange Quattro Pro files or parts of files with other users, no matter where they are.

Step 2
You can set up an address list of people you communicate with. These addresses can be local, or over e-mail.

Step 3
Quattro Pro uses the publish and subscribe system, establishing data-sharing relationships between you and remote users.

Step 4
The grunt work is handled by Borland's Object Exchange (OBEX) application, which keeps files synchronized.

PERFORMANCE

Who has time to wait? Those seconds add up—the more time you save, the more money you save.

You're late. You're late for a very important date. So you want your spreadsheet to rabbit through those calculations. Choose Quattro Pro for Windows 5.0 and you'll make it to the tea party on time.

We performed a number of tests in several key areas, including file loading and saving, recalculation, scrolling, sorting, printing, and executing a macro that performed a variety of common spreadsheet tasks (developed in each product's native macro language). Our test platform was a Compaq 4/33i system (80486 processor running at 33MHz) with 8MB of RAM.

Quattro Pro's performance was admirable across the board. Of the four most important tests (load, save, simple recalculate, and circular recalculate), Quattro Pro won three—one, the circular recalculation, by a tremendous margin. We got the particularly high performance in the circular recalculation (performed by a macro that made a change to a spreadsheet, and then recalculated the whole work sheet) by compiling the formula we were using—an innovation new to this version.

Microsoft's Excel 4.0 for Windows took second prize overall, and registered some particularly impressive sorting results, although its performance in the four key areas was very unimpressive.

Lotus 1-2-3 showed relatively good performance in the four key tests (except that its file-loading times were consistently longer than those of the other products), but it clocked in with the slowest times for several other tests.

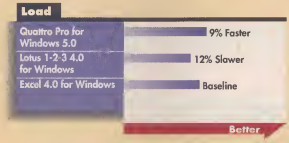
So who's the fastest of them all? Quattro Pro. Its performance results were consistently quick. And with the capability to compile complex formulas, you'll save even more time than you would with the other products.

		Verdict
✓	**Borland Quattro Pro for Windows 5.0**	**94**
	Microsoft Excel 4.0 for Windows	85
	Lotus 1-2-3 4.0 for Windows	80

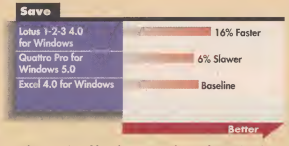
THE QUICKER THE BETTER

Quattro Pro 5.0—not only is it fast, it rhymes.

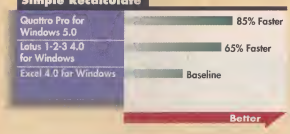
Here are four of the most important performance tests that we ran. Quattro Pro clearly won, but it looks like Lotus 1-2-3 came in second. In most of the other tests we ran, however, Lotus 1-2-3 finished last, leaving Excel in the overall number-two spot.



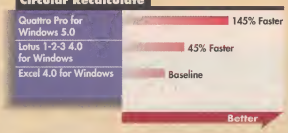
When it comes to loading files, the race goes to the swift Quattro Pro. It's a hair faster than Excel and noticeably faster than Lotus 1-2-3.



When saving files, however, the scales swing in the opposite direction, and Lotus 1-2-3 earns first prize, leaving Quattro Pro dead last.



A simple recalculation is a simple matter. Unless you use Excel, which was go-and-get-a-cup-of-coffee slow. Quattro Pro and Lotus 1-2-3 won.



Life is seldom simple, so our circular recalculation exercised a spreadsheet's capability to keep the spreadsheet up to date.

Expert Mouse 4.0

File Options Window Help

It won't hop.

It won't skip.

But just wait till you see it jump.

Finally. A trackball with software as advanced as its hardware.

Total Cursor Control
Expert Mouse always had superior hardware. Jim Seymour of PC Magazine says, "The best (trackball) by far is Kensington's…Expert Mouse."

Now, with Expert Mouse 4.0, the software is as advanced as the hardware. So advanced, our all new Brilliant Cursor™ technology actually lets you jump the cursor to predefined HotSpots on the screen.

Define. Click. Jump.
First, you define your HotSpots. For example, the "Save," "Undo" and "Print" icons in Word for Windows.

Second, you click a button and move the ball slightly toward the HotSpot.

Third, well there really is no third, because Expert Mouse 4.0 does the rest — automatically jumping the cursor right where you want it.

And if that's not enough, Expert Mouse even remembers where you started and returns you to the exact place you were working.

At your command.
With our programmable mouse buttons, you can automate the Windows functions you use most often. Click and drag. Send keyboard macros. Lock on an axis. Move pixel-by-pixel. Jump to a HotSpot. Send a double click. Even send combinations with just a single click.

And our Custom Acceleration offers three levels of control. Choose between ten standard settings or use our special Custom Acceleraton window for a slower slow and a faster fast.

Combine all this with easy-to-click buttons, stainless steel bearings, a large, comfortable ball — and you have the most advanced input device around.

Introducing Expert Mouse® 4.0

The first truly programmable trackball.

Expert Mouse 4.0 is 100% Microsoft compatible and works with Windows 3.1, OS/2 version 2.x and DOS. Backed by a five-year warranty and toll-free technical support.

For more information, call 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, including upgrade and competitive upgrade information, call and enter 82, and request document 334.

Circle 245 on reader service card.

KENSINGTON

Brilliant Cursor is a trademark and Expert Mouse and Kensington are registered trademarks of Kensington Microware Limited.
All other registered and unregistered trademarks are the sole property of their respective owners. © 1993 Kensington Microware Limited. 7/93

CUSTOMIZING

Who says that one size fits all? Give your business a made-to-measure application: Tailor your spreadsheet.

Your spreadsheet is a canvas and you are an artist, painting that canvas with your personal touches. Mostly you're a minimalist, choosing from a palette of simple, keystroke-saving macros. Any spreadsheet gives you this palette. Sometimes, however, you delve into far more complex art forms: sophisticated applications. For this kind of sculpture, you need a different set of tools that can create buttons, dialog boxes, and new menu systems, preferably without writing code. If artistry is your game, than Quattro Pro for Windows 5.0 is your choice.

Quattro Pro employs a unique User Interface Builder that does almost all the work for you. Compare its dialog-box creation tools with those of Excel 4.0 for Windows and Lotus 1-2-3, and you'll be pleasantly surprised. Where Excel and Lotus 1-2-3 need separate dialog-editor applications, Quattro Pro's applications are integrated. More welcome news for nonprogrammers: Whereas creating dialog boxes used to require endless lines of macro code, Quattro Pro makes the process almost completely visual. A new feature even lets you link your dialog boxes to a custom help file. We did find, however, that customizing the Speed Button bar wasn't as easy as customizing Excel's Toolbar or Lotus 1-2-3's SmartIcon bar, and creating custom @ functions was impossible.

Excel's macros are actually lists of functions stored in a special macro sheet. These functions can be recorded or entered manually. To create custom dialog boxes, Excel gives you a stand-alone dialog editor. But look out—to do anything really significant you'll need to dive into the murky waters of C programming.

Lotus 1-2-3, like Quattro Pro, uses macro commands (which you can record or enter directly), and you don't have the capability to write your own @ functions. In addition, you'll find that the debugging tools are limited to simple step-mode execution, and we weren't particularly impressed with the dialog box and menu editors.

To get great results with surprisingly little pain, go with Quattro Pro. The User Interface Builder makes it look like you've slaved over an application for days, but the integrated and highly visual dialog editor actually does most of the work.

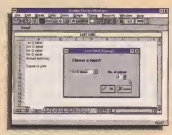
		Verdict
✓	**Borland Quattro Pro for Windows 5.0**	**88**
	Microsoft Excel 4.0 for Windows	79
	Lotus 1-2-3 4.0 for Windows	64

INTERFACE BUILDING

Need a custom dialog box, but don't want to mess with macros?

Quattro Pro's User Interface Builder is a painless way to create attractive and useful dialog boxes with virtually no coding. You draw the controls on a form, and link them to each other or to cells in your work sheet. Bingo! Instant application.

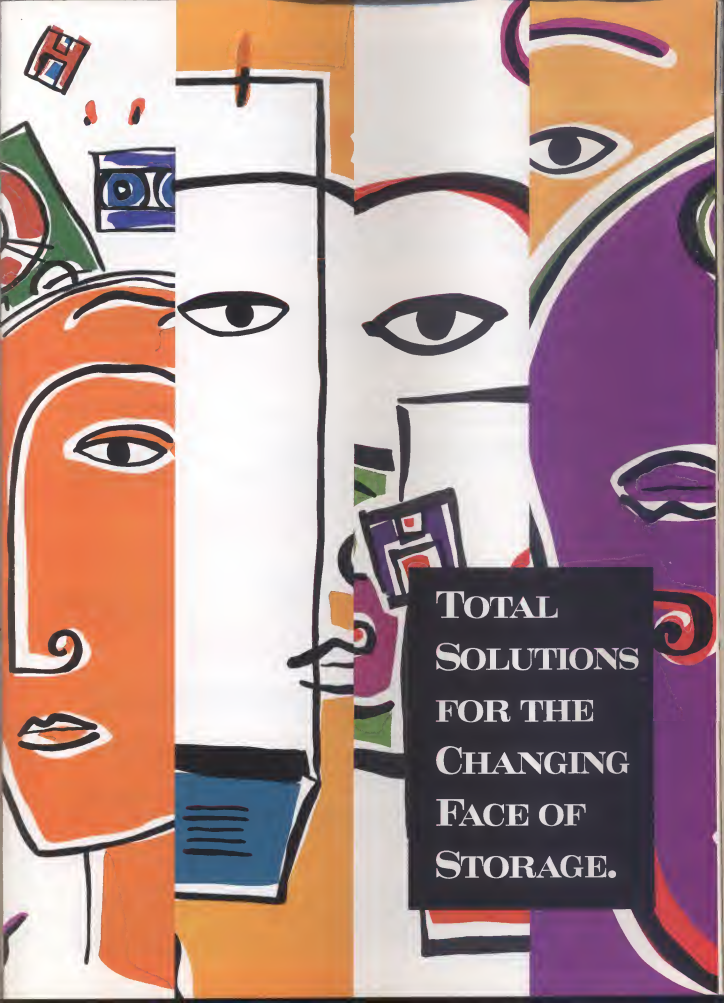
Step 1
Fire up the User Interface Builder and you get a minimal dialog box ready to be built. Note the new SpeedBar (top).



Step 2
Adding a new control button is as easy as clicking on the SpeedBar icon and dragging the icon into the dialog box.

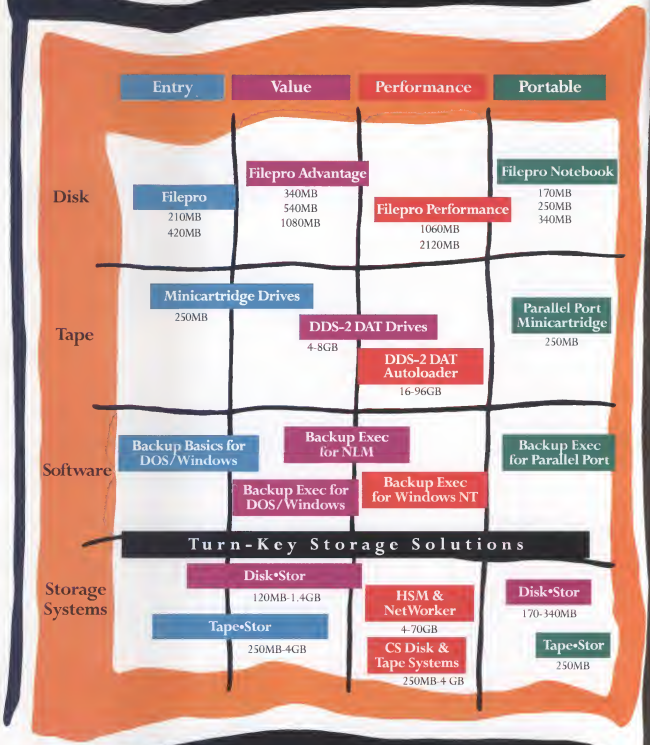
Step 3
To add life to a dialog box control, use the Connection command from the Dialog menu. Pull down, drag, and drop.

Step 4
For more complex linking, use the Object Link command. Here, you specify how the control interacts with other controls.


TOTAL
SOLUTIONS
FOR THE
CHANGING
FACE OF
STORAGE.

THE NEW CONNER

New storage solutions for every market.



IF YOU HAVE A STORAGE NEED, CONNER HAS A SOLUTION.

There's only one company in the storage industry with the vision to put a new face on storage. Conner—the Storage Solutions Company. And now we are introducing over 25 new products:

- new disk drives
- new tape drives
- new software
- new turn-key systems

Products especially targeted at four distinct computing markets:

- Entry
- Value
- Performance
- Portable

It's a simple principle. Each product is fine tuned for the specific needs of our customers. To provide the right capacity, the best performance—and new standards for reliability—at the right price.

Storage needs are expanding, and only Conner has the disk drives and tape backup systems to provide complete data protection. With easy-to-use software—for all market segments.

Conner—the Storage Solutions Company. With the products, R&D, worldwide manufacturing, distribution and support to deliver new storage solutions to every market—for the changing face of storage.

Entry

Low Cost
Capacity
Performance

Value

Cost at Capacity
Performance

Performance

Performance
Capacity
Cost

Portable

Capacity at Cost
Performance

Entry market

Entry level PCs need plenty of storage for today's powerful software, applications and games. For business or home use, 200 to 400 MB is the right capacity range. With tape backup to protect critical data and easy-to-use software to tie it all together.

Value market

Value systems—including mainstream desktop PC's used for advanced applications, databases and multimedia—need low cost storage, with capacities from 300 to 1000 MB and higher performance. Tape backup for these capacities is essential.

Performance market

Performance systems for high-end business, engineering and multi-user environments need fast access to data and high capacity of 1 GB or more. Plus very large backup capability for mission critical requirements.

Portable market

Portable PCs and notebooks for mobile executives need disk drive capacity of more than 200 MB, with low power, light weight and outstanding shock resistance. And cost effective tape backup systems with fully capable software.

TOTAL SOLUTIONS FOR THE CHANGING FACE OF ENTRY LEVEL STORAGE.

Entry level PCs need plenty of storage for today's powerful software, applications and games. For business or home use, 200 to 400 MB is the right capacity range. With tape backup to protect critical data and easy-to-use software to tie it all together.

Entry market priorities:

- Low Cost
- Capacity
- Performance

Filepro 210 MB and 420 MB

Conner's new 3.5-inch Filepro 210 MB and Filepro 420 MB are designed to accommodate the growing storage needs of software, applications, data, graphics and games. These entry-priced drives have patented low power techniques for "Green PCs." Their low-profile design and superior performance outdistance older technology.

- fast 14 msec average seek time
- 3600 RPM rotation speed
- low power (3.8 watts idle)
- one-inch-high design
- PC/AT® interface

Disk

Tape

Software

250 MB Minicartridge Drive

Conner's 250 MB Minicartridge drive is the most versatile and cost effective PC backup solution on the market for today's storage intensive software applications. It's superior design makes installation as simple as plugging the drive directly into the floppy ribbon cable—without the use of adapters or conversion kits.

- one-inch-high design
- backup rate of 9.5 MB per minute
- 250 MB capacity with data compression
- shares floppy interface
- compatible with DOS®, Windows® and UNIX®/XENIX® operating systems

Backup Basics Software

Conner's Backup Basics Software makes your backup tasks easy. It's a two button backup program that lets the busiest operator backup data safely and hassle-free. Without learning another complex software program. All through a simple point and click menu.

- full or differential backup
- data compression for greater capacity on the tape
- backup for Windows and DOS

TOTAL SOLUTIONS FOR THE CHANGING FACE OF VALUE-ORIENTED STORAGE.

Value systems—including mainstream desktop PC's used for advanced applications, databases and multimedia—need low cost storage, with capacities from 300 to 1000 MB and higher performance. Tape backup for these capacities is essential.

Value market priorities:

- Cost at Capacity
- Performance

Disk

Filepro Advantage 340 MB, 540 MB and 1080 MB

The Filepro Advantage Series of low-profile 3.5-inch disk drives is ideal for the full-function PC market. With 340 MB, 540 MB and 1080 MB, this powerful family meets the storage needs of business users for advanced applications, networking and multimedia.

Filepro Advantage	340MB	540MB/1080MB
Average Seek Time	13ms	12ms/10.5ms
Rotation Speed	4011	4500
Buffer	64K	256K
PC/AT Interface	Yes	Yes
SCSI-2 Interface	Yes	Yes

Tape

Software

250 MB Minicartridge Drive

Conner's 250MB Minicartridge drive offers a cost effective backup solution for the value market. With a one-inch-high design, it provides 250 MB of capacity. Plus, it's easy to install without adapters or conversion kits.

DDS-2 DAT 4-8 GB Drive

Conner's DDS-2 DAT tape drive combines high capacity, absolute reliability and performance for high speed, stand alone and networked PCs.

- 3.5- and 5.25-inch internal and 3.5-inch external form factors
- DDS, DDS-2 and DDS-DC formats
- 400 KByte/second native transfer rate
- SCSI-2 interface

Backup Exec Software for DOS/Windows

Conner's value-oriented storage management software provides award winning backup solutions for SCSI tape drives whether they are in use on DOS, Windows or Windows NT™ operating environments. Integrating perfectly into these operating systems, with seamless Graphical User Interfaces and full NetWare® compatibility, Backup Exec simplifies backup and restore operations for individual users or network work groups.

TOTAL SOLUTIONS FOR THE CHANGING FACE OF PERFORMANCE STORAGE.

Performance systems for high-end business, engineering and multi-user environments need fast access to data and high capacity of 1 GB or more. Plus very large backup capability for mission critical requirements.

Performance market priorities:

- Performance
- Capacity
- Cost

Disk

Filepro Performance 1060 MB and 2120 MB

The new Filepro Performance 1060 MB and 2120 MB 3.5-inch disk drives deliver the highest performance and capacity for mission critical applications. Like workstations, RISC systems and high-end PCs. Plus, multi-user environments including servers, storage subsystems and mini or main-frame storage.

- fast 9 msec average seek time
- high speed data transfer rate
- fast and flexible SCSI implementation.
- 5400 RPM rotation speed

Tape

DDS-2 DAT 4-8 GB

Conner's DDS-2 DAT tape drive combines high capacity, absolute reliability and performance.

- 3.5- and 5.25-inch internal and 3.5-inch external
- 400 KByte/second native transfer rate
- SCSI-2 interface
- DDS-DC data compression

Software

DDS-2 Autoloader

Our DDS-2 Autoloader is ideal for networks that require unattended, high capacity backup devices. It allows easy integration and provides the lowest cost-per-megabyte solution in the industry.

- stores up to 96 GB with compression
- 4 cassette magazine standard format, 12 cassette optional
- 5.25-inch full-height form factor

Backup Exec Software for NT

Backup Exec for NT is the first full-featured, 32-bit backup application created for Microsoft Windows NT. Conner developed the backup utility included with the Windows NT operating system. Backup Exec offers an easy-to-use, comprehensive data storage solution for Windows NT-based workstations and servers.

- automatic backup
- disk grooming
- E-mail notification
- remote registry support
- concurrent backup to multiple tape drives

Backup Exec Software for NetWare

For performance applications, Conner has created Backup Exec for NetWare. It's a fully-integrated, client server data management solution that's just right for high powered, data intensive systems. Created specifically for Novell systems, Backup Exec for NetWare allows network administrators to control all backup management operations from the file server or a workstation.

TOTAL SOLUTIONS FOR THE CHANGING FACE OF PORTABLE STORAGE.

Portable PCs and notebooks for mobile executives need disk capacity of more than 200 MB, with low power, light weight and outstanding shock resistance. And cost effective tape backup systems with fully capable software.

Portable market priorities:

- Capacity at Cost
- Performance

Disk

Filepro Notebook 170 MB , 250 MB and 340 MB

The Filepro Notebook Series of 2.5-inch disk drives meet the demanding needs of today's mobile executive. Featuring capacities from 170 MB to 600 MB (with data compression), their patented low power, low-profile, light weight design is perfect for advanced notebooks and other mobile applications.

Tape

- 600 MB capacity with compression
- 0.2 watts power (sleep mode)
- 200Gs of shock resistance
- 12 msec average seek time
- 4500 RPM rotation speed
- less than 7 ounces
- PC/AT or SCSI interfaces

Software

Parallel Minicartridge 250 MB Drive

The new Conner Parallel Minicartridge 250 drive is perfectly featured for a wide variety of portable storage applications. Like mobile notebook computing. And for customers looking for a cost effective method to protect valuable data. Our Parallel Minicartridge 250 combines small size, low weight and maximum ease-of-use. Making laptop and desktop system backup easier than ever.

- plugs into the parallel port
- requires no special controllers or adapters
- includes Backup Exec Software

Backup Exec for Parallel Port

When you're on the move, Conner's new Backup Exec for Parallel Port backup software makes protecting valuable notebook PC data as easy as clicking a mouse. It's a full-featured program providing all of the options you want and need from a comprehensive backup program. Its unique combination of robust features and easy graphical interface make it the ideal backup solution for a wide variety of users on the go.

- schedule automatic backups to run attended or unattended
- run Windows backups completely in the background
- select optional levels of data compression

TOTAL SOLUTIONS FOR THE CHANGING FACE OF TURN-KEY STORAGE SYSTEMS.

From basic single-user needs to complex network storage requirements, Conner Storage Systems Group delivers turn-key solutions, coupled with customized service and support. For every user from entry level PCs to enterprise-wide network administrators.

Disk•Stor

Beginning with the Conner Disk•Stor Series. Available through retailers and mass merchandisers, today's Disk•Stor Series offers disk drives with higher performance and capacity for system upgrades, at competitive prices.

- capacities range from 120 MB to 1.4 GB
- bundled with mounting hardware for easy installation

Storage Systems

Tape•Stor

The Tape•Stor Series offers a full range of easy-to-use tape systems for backing up valuable stored data.

- Minicartridge drives—internal or external parallel, 250 MB
- Data Cartridge drives—internal, 250 MB, 525 MB, 1.35 GB
- DAT drives—internal, 2 GB or 4 GB
- Includes DOS and Windows software

NetWorker

Conner NetWorker offers Novell NetWare users a centralized, enterprise-wide backup and recovery product for complex networks.

- increase performance with concurrent backup of multiple clients in parallel
- true "lights out" operation through scheduling, autoloader support, and automated media management
- support for high performance, high capacity devices including DAT, 8mm and DLT drives and autoloaders

HSM

Conner introduces HSM—the first hierarchical storage management system for Novell NetWare.

- automatically migrates inactive network data to less expensive storage
- supports a hierarchy of hard disks, optical jukeboxes and tape libraries
- transparent user and application recall of migrated data

Autoloaders and Jukeboxes

Conner also offers autoloaders and jukeboxes in capacities up to 50 GB—for DAT, DLT and optical network storage.

CS Disk and Tape Systems

Conner offers the industry's widest selection of SCSI tape and hard drive solutions for UNIX workstations and PC UNIX systems.

- capacities from 250 MB to 4 GB
- tested and certified for compatibility
- supported by a dedicated workstation and PC UNIX technical staff
- direct engineering efforts with all major UNIX vendors

Disk

Tape

THE NEW CONNER

New storage solutions for every market.

Software

Storage Systems

For more information call 1.800.5.CONNER *(in the U.S.)*

See us at COMDEX Booth #L1660

CONNER.
The Storage Answer

Conner Peripherals World Headquarters, 3081 Zanker Road, San Jose, CA 95134, Tel: 408.456.4500. European Headquarters, United Kingdom, 44.628.777.277. Asian Headquarters, Singapore, 65.296.1992. ©1993 Conner Peripherals, Inc. All trademarks or registered trademarks are of their respective owners.

Can ANYONE Make a 15-inch Monitor That's More Affordable Yet Outperforms The Fabulous MAG MX15F?

No Way!

What's new, Costs Less, And Is Better Than The Award Winning MAG MX17F?

A Dream?

New and Improved

- MPR II
- Pincushion Control
- 16 Preset & 8 User Modes
- New Price!

PC Magazine Editors' Choice

March 1993
MX 15F

New and Improved

- MPR II
- Pincushion Control
- Tilt Control
- 16 Preset & 8 User Modes
- New Price!

PC Magazine Editors' Choice

July 1992
MX 17F

A Dream Machine!

Introducing the new and improved MX series. Once again, MAG InnoVision pushes the state-of-the-art in high-performance 15-inch and 17-inch color monitors. ■ Low electro-magnetic and static emissions that meet the Swedish MPR II guidelines are now standard. ■ We've increased the programmable timings to 16 Preset and 8 User to support new high-refresh video modes. ■ We've added pincushion and tilt* controls for distortion-free displays. ■ Best of all, we've made them more affordable. ■ Ask your dealer for a demonstration of the new MX15F and MX17F monitors. Or call us for more information at 800-827-3998, 714-751-2008 (in CA), FAX: 714-751-5522.

© 1993, MAG InnoVision, Inc. All rights reserved. MAG InnoVision and its logo are trademarks of MAG InnoVision. All other brand and product names are trademarks or registered trademarks of their respective owners. *MX17F only.

MAG Innovision, Inc.
2801 South Yale Street
Santa Ana, CA 92704
Circle 181 on reader service card.

MAG INNOVISION™

THE BASICS

Comprehensive online help and built-in assistants make life easier, but good manuals and support are key.

Welcome to the first game of the NSL: the National Support League. With Borland, Lotus, and Microsoft, you're dealing with three top companies that listen to their customers. These are the big leagues. Lotus seems to listen a little better than the rest, though, and that's why Lotus 1-2-3 4.0 for Windows walks away with this trophy.

Lotus follows the trend when it comes to documentation: Leave it out. Why kill the trees when you can reduce the product's bulk and make it easier to locate needed information quickly? Lotus puts all the details about functions and macro commands in the online help system. Lotus 1-2-3's online help is far from perfect, though; it's the only product that doesn't include Wizard-style online assistance. Tech support is first rate and you get 90 days of it for free. You won't be left in the lurch when you hit a stumbling block at three in the morning, thanks to Lotus's round-the-clock, toll-free support line, which closes only on holidays.

Quattro Pro for Windows 5.0 has interactive Tutors that walk you through common procedures using your own data (or sample data, if you prefer). Those, together with Expert advisers and a top-notch online help system make it unlikely that any Quattro Pro user will ever crack the comprehensive, easy-to-read manuals. And even the most complex features can be accessed with relative ease. To help you make the most of Quattro Pro's abundance of icons, just hit the Control key and click on any part of your screen with the mouse to activate a box with a brief description of that element.

Wizards are Excel 4.0 for Windows' forte. Use the ChartWizard, for example, and we can virtually guarantee that you'll end up with the chart that you had in mind. The online help is only so-so. In particular, macro writers will struggle unnecessarily because of Microsoft's decision to leave macro function references in the manuals only. The manuals are thorough, but there's no substitute for having this information at your fingertips as you work.

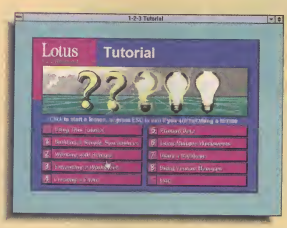
Lotus 1-2-3's main shortcoming is its lack of built-in assistants (for example, Wizards) like those found in Quattro Pro and Excel. But Lotus makes up for that omission with unbeatable online documentation. And if you've got questions—day or night—Lotus is there for you.

		Verdict
✓	**Lotus 1-2-3 4.0 for Windows**	**81**
	Borland Quattro Pro for Windows 5.0	72
	Microsoft Excel 4.0 for Windows	70

HELP IS ON THE WAY!

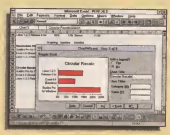
When things go wrong, help is around the corner.

Wizards and Experts and help, oh my! Spreadsheets have such high-powered help features built in that you may never need the manuals. But if you do need these outdated collections of paper, you'll find them well-written.



Latus 1-2-3
Latus didn't include any Experts or Wizards with 1-2-3 4.0, but it has the best help araund. Laok at this tutarial, far example, and if you get stuck, just call, 24 haurs a day—free.

Quattro Pra
Quattra Pra taak a lessan fram Excel 4.0 and built Experts inta Versian 5.0. Just answer same questians and ga.



Excel
Excel includes the ChartWizard, which makes graphing easy. Gaad, because creating a chart withaut it is rough.

More computer users prefer to keep their important data safe and sound on 3M diskettes than any other brand. That's because inside and out, each diskette is built for reliability and tested for 100% error-free performance. Just what you expect from the world's leading manufacturer of diskettes.

Whether you use 2 megabyte diskettes or 21 megabyte Floptical* diskettes, you can depend on 3M. That's why more businesses protect important information on 3M data storage products than any other brand in the world. For more information call 1-800-888-1889, ext. 56.

Circle 163 on reader service card.

The most preferred safe deposit box.

3M diskettes require compatible drives.
Floptical is a registered trademark of INSITE Peripherals. © 1993 3M

3M *Reliability*

PCComputing USABILITY APPROVED

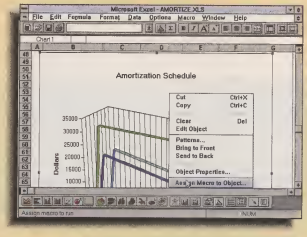
Three Great Products, Three Seals of Approval

Consistently high usability scores. It's rare, but good news for you.

PC/Computing's usability testing aims to turn up nearly every shortcoming a product may have. That's why it's so impressive that Borland's Quattro Pro for Windows 5.0, Lotus's 1-2-3 4.0 for Windows, and Microsoft's Excel 4.0 for Windows all scored above an 80 on our 1-to-100 scale. That means they all deserve the *PC/Computing* Usability Seal of Approval. It also means that you'll find all these products easy to learn and use.

Our usability testing has two basic parts: In the first part, we observe a panel of users performing predefined tasks with the spreadsheets, and in the second part, we interview these users to find out how they felt about each product. The first part of the test tells us how efficiently each product gets a job done—how many keystrokes it takes, how many times you'll have to search through menus and call up help to find a particular command, and so on. The second part of the test tells us how much you'll like to use the product. There are times when a product may be incredibly efficient, but not pleasant to use. We'll catch them.

This time, we'll pass out bravos all around.

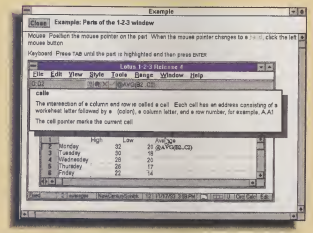


PCComputing USABILITY APPROVED

Score: 86

Excel 4.0 for Windows

Pop-up menus are just one of the usability features in Excel 4.0. You've already seen the revolutionary ChartWizard. No wonder Borland's taking usability lessons from Microsoft.

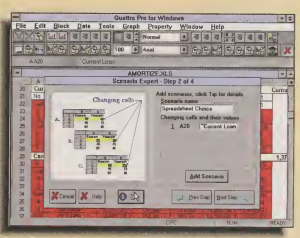


PCComputing USABILITY APPROVED

Score: 85

Lotus 1-2-3 4.0 for Windows

Lotus 1-2-3's longest and strongest suit is its online help, which is particularly well-written and comprehensive. In fact, Lotus ships 1-2-3 without manuals when it can.



PCComputing USABILITY APPROVED

Score: 82

Quattro Pro for Windows 5.0

Borland copied the idea of Wizards from Microsoft and went a step further. You'll find Experts for graphing and data analysis to mention two top areas.

USABILITY

Everything should be this easy. Excel, Lotus 1-2-3, and Quattro Pro pass our usability tests with flying colors.

Like fine wine, some things just get better with age. Take spreadsheets, for example. When we brought these three veteran spreadsheets into the *PC/Computing* Usability Labs, we recorded scores that were admirably high and whisker-close. In the end, though, Excel 4.0 for Windows won by a hair.

As we tested, we noticed a pattern with all of the products. Despite all sorts of shortcuts, our evaluators would go straight for the main menu to perform a task with an unfamiliar product. If a product had well-designed menus (for example, Excel), this approach was fine. Unfortunately, not all the products did. Quattro Pro for Windows 5.0, for example, had particularly unwieldy menus.

Excel earned its top spot by making some tough tasks a snap. Take sorting, for example, where Excel aced our usability trials. One tester even called Excel's sorting feature "a joy to use." Excel's auditing (or logic tracing) capability was much less troublesome to our users than Quattro Pro's. Users also gave Excel's table and formula capabilities high satisfaction ratings. And the ChartWizard makes graphing a snap. Excel fell down (collapsed, actually) when we asked testers to move and manipulate data. By trial and error, all our users accomplished the task, but it took too long.

Lotus 1-2-3 4.0 for Windows topped our tests of basic features—formulas, cell editing, and data movement. Users found the commands straightforward and intuitive, and when they stumbled, the online help was right there to get them back on their feet. However, nearly all of the users reported that specifying a data range and selecting a key for sorting was less than intuitive.

Quattro Pro fell short in our logic tracing test—evaluators had far fewer problems with Excel and Lotus 1-2-3. Quattro Pro offers error tracing, but no automatic feature to trace the history of results. Sorting was another sore spot, but the documentation provided more guidance than found with Lotus 1-2-3 to accomplish the task.

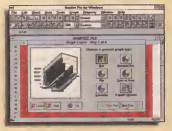
Are all three spreadsheets usable? Yes. Is one more usable than the others? Overall, Excel earns that distinction by the slenderest of margins, thanks to an intuitive interface and the magic of Wizards.

		Verdict
✓	**Microsoft Excel 4.0 for Windows**	**86**
	Lotus 1-2-3 4.0 for Windows	85
	Borland Quattro Pro for Windows 5.0	82

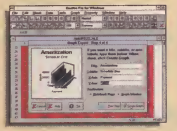
WIZARDS VS. EXPERTS

A face-off of the two best interactive tutorials around.

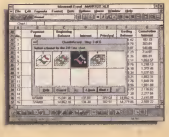
Microsoft started a trend when it introduced Wizards last year. That trend is to walk users through a task, making intelligent suggestions along the way. Borland grabbed that idea and ran far and long, arriving at the Experts: Wizards on steroids.



Quattro Pro
Borland took one look at Microsoft's Wizards and decided that they were the feature to emulate. And they did, with excellent results.



Quattro Pro
After offering you its best graphical interpretation of your data, the Graph Expert makes titles and labels easy.



Excel
If you're an Excel user you know the ChartWizard, which makes great graphs. Compare it to Quattro Pro's Expert, and it looks tired.

Excel
One of the major omissions in the ChartWizard is the equivalent of Quattro Pro's Expert's Choice: The ChartWizard isn't as "smart."

What It Takes to Stay on Top

Excel 5.0 gives an amazing make-over to the venerable Version 4.0.

Our Usability Labs are haunted. Every time we turn around, the Ghost of Spreadsheets Yet to Come reminds us that picking the best in any software category is always a matter of timing. Excel 5.0 wasn't ready for this face-off, but our first impressions of a prerelease copy suggest that the best spreadsheet of 1993 may be just around the corner.

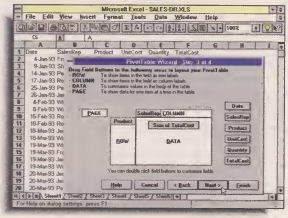
On the surface, the new Excel includes plenty of cosmetic changes and a seemingly endless list of usability enhancements. Dig deeper and you'll discover a true 3-D workbook and several new data handling features, including an impressive PivotTable feature that addresses basic multidimensional needs. There's also support for OLE (object linking and embedding) 2.0 and some new workgroup enhancements. But the feature that will arouse the most interest is the premiere of Microsoft's Visual Basic Applications Edition—built right in, and destined to serve as Excel's new macro language.

TOWARD A COMMON LOOK AND FEEL

Ever wonder why the company that invented Windows turns out applications with such different menus? Wonder no more. Microsoft is on a crusade to standardize application interfaces with common menus, dialog boxes, and toolbars. The vastly modified menus in the new Excel are virtually identical to those in the new Word 6.0 for Windows (see "The Best Word Yet," page 316). The payoff isn't just familiarity; it also facilitates in-place editing of OLE 2.0 objects.

Other usability enhancements include consolidated dialog boxes and tabbed dialog boxes that let you control the properties of cells, work sheets, graphs, and so on, like Quattro Pro's Property Inspectors.

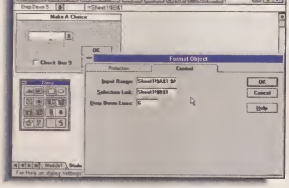
Part of this crusade is dedicated to the creation of a common macro language: Visual Basic Applications Edition. With Excel 5.0, Microsoft starts to live up to its promise to make this popular programming language the standard macro language in all its applications. In case you don't know, Visual Basic is an object-oriented development language that's astoundingly easy to learn. Gone are the days of learning one macro language for your database and another for your spreadsheet; you'll soon have fewer macro manuals lying around. And if you're worried about your existing Excel 4.0 macros, don't: Excel 5.0 provides extensions to Visual Basic that enable some backward compatibility.



You can set up a database as a pivot table using Excel 5.0's PivatTable Wizard. A pivot table is a data analysis tool that's similar to the one in Latus's Improv.

Excel 5.0 also improves the spreadsheet's data sorting and database capabilities. For example, sorting a table now involves only a single mouse click. Move the cell pointer to the column that you want to sort on and click on a toolbar icon (no need to select the table first). For multikey sorts, Excel automatically identifies the range where your cell pointer is, and there's a new dialog box that automatically locates and displays field or column names. You can even sort nonalphabetically, using built-in custom lists. For example, if you sort a column with month names, January will come first, before April.

Querying a database is as easy as . . . well, as easy as the new Lotus 1-2-3 4.0, and a far cry from the old criteria and extract ranges. Select the Data Filter command and the cells that hold your field names are transformed into drop-down list boxes that display all of the unique entries in the column. You set criteria for



The new tabbed dialog boxes allaw one-stap shapping far changing the current selection. Easy-ta-use tabbed dialog boxes are standard in OS/2 2.1 and are coming to Windows.

the values you want to display, and Excel hides all rows that don't qualify. The new Data Pivot Wizard walks you through the steps required to convert a database table into a "pivot table." This lets you summarize and manipulate multidimensional data and change the view by dragging category names from one location to another—just as in Lotus Improv.

And for external database access, you'll no longer find a copy of Q+E bundled with Excel. In its place is the more manageable Microsoft Query. If you've used Microsoft Access, you'll recognize the interface instantly.

You'll also find some welcome enhancements to Excel 4.0's already-powerful charting tools. Graph editing now allows direct manipulation of objects. You can drag the graph title wherever you want (Excel 4.0 locks the title to the top of the graph). You can also drag a range of data into an existing graph, and Excel 5.0 will graph the new data using the format of the existing graph.

Best of all, there's a new Wizard in town: the Tip Wizard—which watches you work and suggests specific time-saving tips or shortcuts. For example, if you use the Autofill feature, the Tip Wizard will remind you that dragging the Autofill handle with the right-mouse button displays a list of fill options. When the Tip Wizard has something to say, it changes the color of a toolbar icon. Click on the icon to read the tip—and click on another icon to jump to a help topic.

SWEATING THE DETAILS . . .

At the nuts-and-bolts level, Excel 5.0 is full of pleasant surprises. Like Lotus 1-2-3 for Windows, Excel now offers in-cell editing, so your eyes don't have to shift to the top of the screen when you edit. But the new Excel goes one step further with support for rich text formatting, which lets you combine multiple fonts and attributes in a single cell. The streamlined toolbars also reduce clutter. There's no longer a separate tool for each drawing object; click on the drawing tool and it expands to reveal the full selection of tools.

All these minor changes may improve usability in the long run, but experienced Excel users may suffer some short-term confusion, because of the drastic changes in the menu system. Alt-E-W (Edit Fill Down), for example, won't do a thing. Microsoft is gambling that the more logical ordering and the variety of new shortcuts will make up for time lost in the transition. But they've hedged their bets by offering an option to display Excel 4.0 style menus.

The list price of Excel 5.0 is $495, the same as previous versions of Excel, and it should be available before the end of the year. It's an amazing spreadsheet—well worth the upgrade and likely worth switching from another spreadsheet. All in all, it looks like Excel 5.0 could have taken on all comers if it had been ready. Look for our hands-on review coming soon.

STILL ALIVE AND KICKING

DOS spreadsheets are still selling well.

The sleek new Windows spreadsheets get most of the development dollars and all the headlines. But that doesn't mean that old DOS workhorses like Lotus 1-2-3 and Quattro Pro are ready for the glue factory. Lotus and Borland have kept both products lean and lithe, making them attractive alternatives to the resource-hungry Windows versions. Even on underpowered hardware, they're fast and snappy, and for basic spreadsheet applications, they'll get the job done.

Non-Windows spreadsheets are best suited for systems that can't run Windows well (like 286 or slower 386 PCs) and for those who work almost exclusively in a spreadsheet. Thanks to their minimal hard-disk requirements and memory footprint, they're also ideal on older, less powerful laptops and notebooks.

Lotus gives you two non-Windows spreadsheet choices. Lotus 1-2-3 2.4 for DOS has two major limitations: It can't handle more than one file at a time, and work sheets are strictly of the two-dimensional variety. Lotus 1-2-3 3.4 for DOS overcomes both of these shortcomings, and offers a raft of advanced features. Both include an optional graphical user interface, implemented as an add-in. But these GUIs are memory hogs and are crude by modern standards.

Borland released Version 5.0 of Quattro Pro for DOS at the same time as its latest Windows release. As with the previous version, it lets you work with multiple files in movable and sizable windows. The optional GUI is built right in (but still no match for a genuine Windows interface). Version 5.0 now supports true 3-D work sheets, with the tab display to quickly jump to other pages.

Computer Associates has CA-SuperCalc, a DOS spreadsheet with 3-D capabilities and a wealth of other features. For example, it's network-aware and Lotus 1-2-3 compatible. It will produce output in a variety of formats including PIC, GEM, and CGM. For $149, it's quite a deal.

There's still plenty of life in these non-Windows spreadsheets, and we suspect that they'll be with us for some time to come.

CA-SuperCalc •$149 • Computer Associates Int'l • 1 Computer Associates Plozo, Islondio, NY 11788 • (800) 225-5224, (516) 342-5224
Circle No. 686 on Reader Service Card

Lotus 1-2-3 for DOS • $595 (for Version 3.4; $495 for Version 2.4) • Lotus Development Corp. • 55 Cambridge Pkwy., Cambridge, MA 02142 • (800) 343-5414, (617) 577-8500
Circle No. 687 on Reader Service Card

Quattro Pro for DOS 5.0 • $49.95 • Borlond Int'l • P.O. Box 660001, Scotts Volley, CA 95067 • (800) 331-0877, (408) 431-1000
Circle No. 688 on Reader Service Card

PC/COMPUTING SCORECARD

Crunch the numbers and Quattro Pro comes out on top—but Excel is right behind.

FACTORS	Borland International Quattro Pro for Windows 5.0	Lotus Development Lotus 1-2-3 4.0 for Windows	Microsoft Excel 4.0 For Windows
Creating work sheets 15%	85 Can create 256 spreadsheet pages; compiles formulas to boost speed.	73 Handy 3-D work sheet; weak group editing.	87 Locks a 3-D work sheet; offers great outlining.
Data analysis 15%	85 Unique data modeling features	64 No advanced analytical tools; great data querying tools.	78 Strong Analysis Toolpak add-in; superior array formulas.
Chart, format, and draw 10%	88 Best charting tools; lacks some formatting options.	72 Offers angled text in cells; substandard charting.	86 Great text handling and charting.
Integration 10%	96 Tops for unique workgroup features and extensive file support.	73 Limited; can send mail from spreadsheet environment.	81 No workgroup features; reads and writes most file formats.
Performance 10%	94 Fastest performer; can compile formulas.	80 A good performer, but overall the slowest of the bunch.	85 Fast, but slow recalculation.
Customizing 10%	88 Strong macro language and unique User Interface Builder.	64 Developing custom dialog boxes is a drag.	79 Difficult macro language; tough for custom dialog boxes.
The basics 5%	72 Lots of teaching aids built right in.	81 Online documentation; support never sleeps.	70 Good manuals, but no macro details online.
Usability 25%	82 Number of options overwhelming; complex menus.	85 The focus on usability really paid off.	86 Wizards and other enhancements are a plus.
TOTAL SCORE	86.2	74.8	82.9

PHOTO FINISH

We've turned up the heat on three great products.

Look at the Scorecard, look at the Decision Maker, and you'll see Quattro Pro 5.0 walking away with the winning scores. Look at the individual scores more closely, though, and you'll see some fierce competition that the final numbers don't reveal.

Quattro Pro is particularly strong in data analysis, integration, charting, performance, and customizing. That's because this new version has some enhancements to help make its otherwise overwhelming interface more bearable. One of our main complaints about this otherwise stellar product is its long and confusing menus. For $49.95, however, it's hard to quibble.

Although it's only one year old, Excel 4.0 was not too far behind Quattro Pro in practically every category. And as far as all-important usability goes, Excel 4.0 beat Quattro Pro. But Excel 4.0 is last year's product. Watch for the $495 Excel 5.0 with its new Wizards, macro language, and multidimensional capabilities.

Lotus 1-2-3 4.0 for Windows is a solid, easy-to-use spreadsheet that covers all the basic features you'll need and is very usable. In addition, its online help was the best we saw. Relative to Excel and Quattro Pro, however, the $495 Lotus 1-2-3 for Windows comes up short. In particular, it lacks some of the advanced data-analysis features found in these other products, as well as the luxury of built-in assistants.

Software is a continuing process of leapfrogging; the product with the most recent version (and design) is likely to be the best at the time. Ultimately you should choose a spreadsheet with an interface that you like. Do you like Microsoft's Wizards? Then go with Excel. How about Borland's unique dialog box design and Experts? Then Quattro Pro is for you. Are you a die-hard Lotus 1-2-3 for DOS user who is just moving over to Windows? Then you'll love Lotus 1-2-3 for Windows in its compatibility mode.

CompuServe does Windows.

Introducing a whole new way to look at CompuServe: CompuServe Information Manager for Windows (WinCIM™). It's a fully integrated Windows application, and lets you take advantage of Windows when you're on CompuServe. It'll make your session faster, more efficient, easier, and a lot more fun.

With the help of icons and pull-down menus, you'll find your CompuServe time is almost effortless. Cruise the forums, browse through your messages, download files — it's all about as simple as clicking a mouse button.

And with WinCIM you can do more offline, too. That means everything from writing letters to reading the answers to your hardware and software questions can be done much more economically.

So take a look for yourself. If you're already a CompuServe member, just type GO WINCIM. If you aren't, call us for more information at 1 800 848-8199. Either way, you'll soon see why the best view is the one from CompuServe Information Manager for Windows.

CompuServe®

The information service you won't outgrow.™

Circle 128 on reader service card.

Windows is a trademark of Microsoft Corporation

Into the Fourth Dimension

Multidimensional modeling software takes spreadsheets a step further.

Tired of weaving a twisted web of numbers with your spreadsheet? Find relief with multidimensional modeling software from Lotus Development and Computer Associates. Even the best spreadsheets have a limitation: They work with data in only three dimensions. Wait a second. *Three* dimensions? Even Einstein admitted that he couldn't think in more than two. But your complex budgets and profit projections require multidimensional analysis. That's when you turn to a special tool: multidimensional modeling software.

We brought two packages into our labs for evaluation and usability testing: Computer Associates' CA-Compete 5.0 and Lotus's Improv 2.1. Our findings: You won't want to replace your everyday spreadsheet with one of these complicated packages, but CA-Compete won our usability tests because it looks and feels more like a conventional spreadsheet. Improv proved more robust, but much harder to learn and use.

THINKING MULTIDIMENSIONALLY

It's easy to think in three dimensions if you have a good example: Just picture a stack of two-dimensional work sheets. For example, look at a typical budget. You start with one sheet that has months across the top, and budget line items down the first column. That's two dimensions. Now, duplicate this page once for each department in your company. Now, every cell is uniquely identified by the intersection of a budget item, month, and department. That's three dimensions.

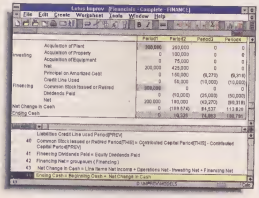
Now try to add actual expenditures to this spreadsheet. You can't—at least not easily. You could create separate 3-D files and use external links in your formulas. Or, you could simply copy the entire 3-D block and paste it below the budget categories to create a template for actual expenditures. Both solutions are messy and error prone. What you really need is a fourth dimension in your spreadsheet. With multidimensional modeling software, you just link in the new calculations you want and they appear on a new page.

NOT SPREADSHEETS

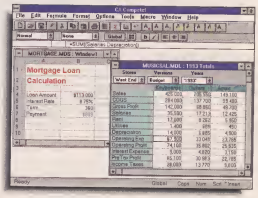
CA-Compete and Improv may look like spreadsheets and even behave a bit like them, but they aren't. And it's not just that you can work in up to twelve dimensions with them. There are three key distinctions.

Multidimensional modeling software stores data centrally, as in a database. That means that a particular data point is not tied to a specific cell.

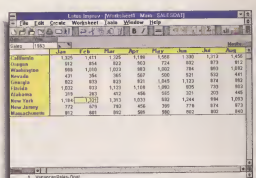
You create formulas globally. Say good-bye to the



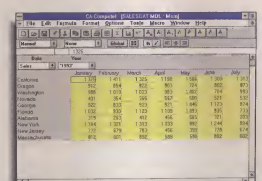
In Improv, you enter formulas in a special formula pane using category and item names. You also have a wide assortment of built-in functions at your disposal.



CA-Compete lets you work with standard 2-D spreadsheet models as well as multidimensional scenarios. The spreadsheet commands are remarkably similar to Excel's.



Improv step 1: A 4-D Improv madel. The dimensions are 12 items af months, 10 items of states, 3 years, and a plan dimensian with three items af goal, sales, and variance.



CA-Compete step 1: The same 4-D madel, but set in CA-Compete. Ta display a different item from the plan ar year dimensian, you use the drap-dawn list baxes.

trick of building a formula and then copying it. Now you can create a formula in one place and reference it easily.

You work with meaningful names rather than obscure cell references. For instance, a global formula can read, Variance = Budget – Actual. What could be simpler?

Despite these distinctions, CA-Compete and Improv still look like spreadsheets. CA-Compete even offers a decent 2-D spreadsheet mode that looks and works a lot like Excel. It's not state-of-the-art, but it's good enough that you may not need to have a separate spreadsheet.

Improv, on the other hand, is not really appropriate for many common spreadsheet tasks—especially unstructured ones where you're just playing with your data. That's because Improv stores its data centrally, and makes it particularly difficult to refer to individual items.

PUT TO THE TEST

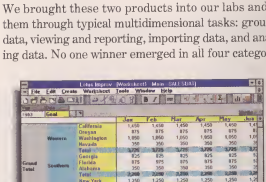
We brought these two products into our labs and put them through typical multidimensional tasks: grouping data, viewing and reporting, importing data, and analyzing data. No one winner emerged in all four categories:

We preferred Improv for grouping and viewing data, and CA-Compete for its data importing and analysis tools.

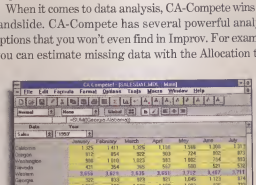
One of Improv's key advantages over CA-Compete is its grouping option: It automatically aggregates items that go together. For example, it's a snap to group together all budget items associated with compensation. Select the items, choose the Create Item Group command, and provide a name for the group. To get that kind of a subtotal in CA-Compete, you must manually develop the formulas. And to hide the detail, you need to manually hide the rows.

Similarly, for viewing and reporting, Improv comes on strong. It's designed so that you can drag the category icons around to change the view, and you can stack the icons on top of each other. The bottom line? You can display data from more than two dimensions at a time with Improv, but CA-Compete limits you to two.

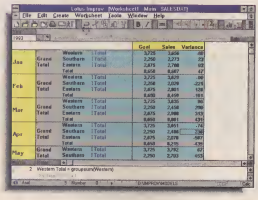
When it comes to data analysis, CA-Compete wins in a landslide. CA-Compete has several powerful analysis options that you won't even find in Improv. For example, you can estimate missing data with the Allocation tool.



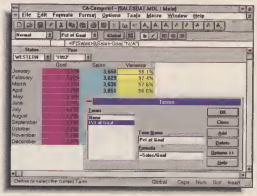
Imprav step 2: The same Imprav model after grauping states inta regians and letting Imprav write formulas ta calculate regianal subtotals automatically.



CA-Compete step 2: The same madel after inserting regians and adding farmulas ta calculate subtotals. A global farmula makes it easy ta enter a general farmula once.



Imprav step 3: The same model after rearranging the dimension icans and collapsing the regians to hide the detail. Changing ta this view takes anly seconds.



CA-Campete step 3: CA-Campete lets yous specify alternative ways af displaying data. Here, we're displaying the variance data as the ratio af sales ta gaal.

CA-Compete also includes a unique goal-seeking command that helps you solve problems. And it's a breeze to perform simple linear or exponential growth forecasting.

DIMENSIONS OF USABILITY

No doubt about it, these products are much more complicated than the average spreadsheet. When you start thinking in four or five dimensions, you can almost hear your neurons start to sizzle. Fortunately both programs have usability aids to see you through. For example, both products use the right-mouse button to display a context-sensitive shortcut menu.

When we brought these products into our Usability Labs, however, they fell short of the standards set by traditional spreadsheets. Our usability testers, all of whom were experienced spreadsheet users, found these products difficult to adapt to. CA-Compete fared better than Improv, primarily because it's more spreadsheet-like, but almost all the testers agreed that it would take a long time before they felt comfortable working with either program. In the final analysis, CA-Compete rated a 73.7 (on our 1-to-100 scale) compared to Improv's 59.8. This is not unexpected, since Improv has very little in common with the typical notion of a spreadsheet.

THE BOTTOM LINE

Both CA-Compete and Improv are powerful products, but they take much longer to learn than a typical spreadsheet does. Improv, in particular, will take a while. Improv and CA-Compete both list for $495. If your current spreadsheet has run out of gas, we recommend you take a serious look at the more approachable CA-Compete.

WHICH WILL IT BE?

For most users, CA-Compete will get the job done.

You don't need a Saturn V racket to commute to wark. So if your spreadsheet needs are limited to quarterly forecosts and simple lists, stick with the mainstreom choices. But if data whizzes by you from every direction ot supersonic speeds, o multidimensionol spreadsheet will help you keep poce. Yau con use it to greotly simplify mony tosks thot would be tedious and time-consuming with o traditionol spreadsheet.

Of the two alternatives we reviewed, CA-Compete is eosier to work with, since its methods mimic those used in troditionol spreadsheets. It also offers stronger anolytical, forecosting, and doto import copobilities. And since it serves double duty by supplying you with o 2-D spreodsheet, it's a better value thon Lotus Imprav.

If moximum flexibility of design ond doto monipulotion is a must, though, your choice will be Improv. Improv moy take longer to leorn, but it's much more flexible when it comes to viewing and reporting. And its ability to automote the process of grouping items will sove you time. But if you're not fomilior with the poradigm of multidimensionol spreodsheets, be prepored to learn.

If you're regulorly spending hours setting up complex work sheets, o multidimensionol spreodsheet moy be for you. And if it is, check out CA-Campete.

CA-Compete 5.0 • $495 • Computer Associotes Int'l • 1 Computer Associotes Plozo, Islondio, NY 61288 • (800) 225-5224, (516) 342-5224
Circle No. 689 on Reader Service Card

Improv 2.1 • $495 • Lotus Development Corp. • 55 Combridge Pkwy., Combridge, MA 02142 • (800) 343-5414, (617) 577-8500
Circle No. 690 on Reader Service Card

QEMM 7 finds room nobody else can.

Sooner or later, you'll get an "Out of Memory" message. Whether you have 1 megabyte or 16.

TSRs and network utilities need memory right where your programs need it, too. It's called 'lower' or 'conventional' memory.

Adding RAM to your PC just gives you more expanded or extended memory — accessible to some programs, but not to TSRs like fax utilities, device drivers or network utilities like Novell NetWare. Fortunately, there's an easy software solution to "out of memory" problems.

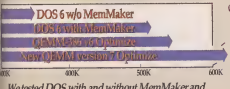
NO VACANCY

Have your cake and eat it, too.

The more memory you have, the more flexibility and reliability you can enjoy. Thanks to our patent-pending 'Stealth' technology, QEMM finds as much as 96K more high memory than other memory managers.

No one has yet been able to match our performance. No wonder QEMM outsells all the others *put together!*

QEMM™ puts the maximum memory right where your favorite programs need it so you can run them and TSRs without 'out of memory' problems or conflicts. That keeps your PC running smoothly and performance at its best.



We tested DOS with and without MemMaker and with QEMM 6 and our new QEMM 7 runs away from all of them. See details of test conditions below.

"I needed another 32K for my favorite TSR. I added 2 megabytes. I still need 32K! What gives?"

Protect your productivity; keep your work safe.

Any task, from programming to writing the company business plan to composing a personal letter, takes time and thought. Your PC is supposed to make that process easier; your output better. When you can't run your favorite grammar-checking TSR or have to get by without a vital network utility, you're sacrificing productivity.

Whether you're running MS-DOS, IBM™ PC-DOS, DR DOS, Novell DOS or MS Windows; one megabyte or eight, don't sacrifice; don't compromise; don't risk losing work.

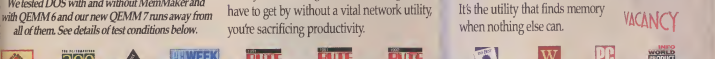
QEMM comes with the new version of Manifest, the award-winning memory analyzer that helps you see how your PC works.

Managing your memory well is the best way to assure your work won't go to waste.

QEMM version 7 is the most powerful, flexible memory manager you can buy.

It's the utility that finds memory when nothing else can.

VACANCY



Quarterdeck

Circle 174 on reader service card.

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel.(353) (1) 284-1444 Fax: (353) (1) 284-4380

How we got the chart numbers: CPU—486 (3) ALR Power Business VESA machine equipped with 16 meg of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the device drivers required by each memory manager, the following drivers, DOS resources and programs were loaded for ease comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=15, STACKS=9,256 MOUSE.SYS, SMARTDRV.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: WAVE, MSCDEX, UNDELETE, ESL.COM, NE2000.COM, IPXODI.COM, NETX, QFIBMNET, MOUSE.COM, SMARTDRV.COM, PRINCACP.COM ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners

DOS

Five Tips That Let You Take Control of Your Keyboard

DOS'S POWERFUL OPTIONS FOR CUSTOMIZING YOUR KEYBOARD LET YOU MAKE THINGS WORK YOUR WAY—FAST AND EASY. **BY JEFF PROSISE**

DON'T LET YOUR keyboard get the better of you. Master it with these five shortcuts to reduce typing time and streamline keyboard operations.

Rev Up the Cursor

One of DOS's best-kept secrets is that since Version 4.0 the MODE command has been able to reprogram most keyboards to increase their *typematic rate*—the rate at which a character repeats when a key is held down. MODE also lets you control the keyboard's *delay interval*—the length of time between when a key is pressed and typematic repeat begins. The command

```
MODE CON: RATE=32 DELAY=2
```

maximizes the typematic rate while leaving the delay set to its ½-second default. The RATE setting specifies the repeat rate in characters per second. Valid values range from 1 to 32; the default is fewer than 20 characters per second. Valid values for DELAY are 1, 2, 3, and 4, representing ¼-second, ½-second, ¾-second, and 1-second intervals, respectively. The command

```
MODE CON: RATE=32 DELAY=1
```

maximizes the typematic rate and minimizes the delay interval, producing the fastest possible typematic operation. If you've never tried this before, you'll be surprised at how quickly the cursor scampers across the screen in a spreadsheet or word processor when you press and hold an arrow key.

Experiment with different keyboard settings until you find one you like, then add it to your AUTOEXEC.BAT file. Note, however, that this form of the MODE command does not work with old PC- and XT-style keyboards; it requires a keyboard of the more recent AT vintage.

Ditch Num Lock

Ever since the BIOS of the IBM PS/2 defaulted to Num Lock=On, many users have wanted a way to disable Num Lock at boot-up. While some BIOS setup screens let you specify Num Lock's default condition at boot-up, most do not.

Microsoft solved this problem in DOS 6.0. If you're running it, you can disable Num Lock by adding the following line to your CONFIG.SYS file:

```
NUMLOCK=OFF
```

If you haven't installed DOS 6.0, type this DEBUG script with an ASCII editor and name it NUMOFF.SCR.

```
N NUMOFF.COM
E 0100 B8 40 00 8E D8 80 26 17
E 0108 00 DF C3
RCX
0B
W
Q
```

Make sure that the DOS file DEBUG.COM is in the current directory or in a directory on your search path, and type this command to create NUMOFF.COM:

```
DEBUG < NUMOFF.SCR
```

Next, place NUMOFF.COM in your AUTOEXEC.BAT file in order to have it execute each time you boot up. If NUMOFF.COM is not stored in a directory that's named in your PATH statement, include a pathname with the command or add that subdirectory to AUTOEXEC.BAT's PATH statement.

Save Time with Macros

If you use DOS 5.0 or DOS 6.0, you can use DOSKEY to convert frequently used or unwieldy commands into fast-acting

DOS Helper — PC Contact

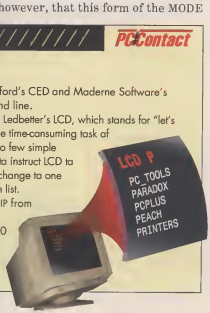
Let's Change Directories

Keyboard utilities are abundant. Chris Dunford's CED and Moderne Software's Anarkey led the way in taming the command line.

But for something a little different, try Keith Ledbetter's LCD, which stands for "let's change directories." This program reduces the time-consuming task of locating and changing to a new directory to a few simple keystrokes. Type LCD P an the command line to instruct LCD to list every subdirectory that begins with *P*. To change to one of these directaries, select it from an anscreen list.

For a copy of LCD, download LCDEXE.ZIP from PC/Contact's data library 3 (Utilities/Misc.). Or write to Keith Ledbetter at 4240 Ketchum Dr., Chesterfield, VA 23832. The registration fee is $15.

Circle No. 894 on Reader Service Card



macros. For instance, the command line

```
DOSKEY WHEREIS=DIR \$1 /S /B
```

creates a WHEREIS macro that searches every directory on the current drive for the file or files that you specify. When you type WHEREIS *.TMP, DOS lists every TMP file on your hard drive.

Here are three more indispensable command macros that save time. Add these lines to your AUTOEXEC.BAT file:

```
DOSKEY MDEL=FOR %%F IN ($*)
  DO DEL %%F
DOSKEY ZAP=ATTRIB -H -S -R $1 $
  T DEL $1
DOSKEY PD=CD..\$1
```

These commands install DOSKEY macros that act just like internal DOS commands. MDEL works just like the DEL command but accepts multiple file specifications (for example, MDEL *.BAK *.TMP *.OLD). ZAP deletes stubborn files that defy the DEL command (use it if the DEL command returns "Access denied" or "File not found" messages). And PD moves to a parallel directory—if the current directory is C:\WP\DOC and you want to go to C:\WP\MEMOS, type PD MEMOS.

Macros don't have to be complex to be useful. This handy DOS 6.0 macro shortens the DBLSPACE command to the more manageable DS:

```
DOSKEY DS=DBLSPACE $*
```

Sometimes the simplest macros provide the most helpful utilities.

Function-Key DOS Commands

Install DOS's ANSI.SYS device driver in your CONFIG.SYS file by entering the following line:

```
DEVICE=C:\pathname\ANSI.SYS
```

Then use the PROMPT command in order to assign DOS commands to function keys. For example, at the DOS prompt, type this command:

```
PROMPT $E[0;59;"DIR /O /P$_"p
```

Then restore the normal command prompt by typing PROMPT PG. Press F1 for a sorted directory listing.

In this example, the 0;59 identifies the

/// Hot Tips ///

Locate Files *Fast*

If you're like most people, you don't label your floppy disks as clearly as you should—which makes locating an important file among a pile of floppies a real pain. Use this batch file to automate the process of searching multiple floppy disks, and make it a snap to find any files you want.

To create the batch file, use DOS's EDIT or another text editor. Type the following lines exactly as listed here, and save the file as FINDFILE.BAT:

```
@ECHO OFF
IF %1!==! GOTO HELP
:LOOK
ECHO Insert a disk to search in drive A:.
PAUSE > NUL
DIR A:\%1 /S | FIND "FILE(S)" > SEARCH.TXT
COPY /B SEARCH.TXT+,, > NUL
IF EXIST SEARCH.TXT GOTO FOUND
GOTO LOOK
:FOUND
DEL SEARCH.TXT
DIR A:\%1 /S /P
ECHO.
CHOICE /C:YN "Search more disks for %1 "
IF ERRORLEVEL 2 GOTO END
GOTO LOOK
:HELP
ECHO Use %0 to locate files on your floppy disks.
ECHO It prompts you to insert new disks until it finds
ECHO the one that contains the file you're looking for.
ECHO Syntax: %0 filename (wildcards are OK)
:END
```

To use FINDFILE.BAT, type FINDFILE followed by a space and the filename or file specification you want to find. For example, to search for batch files on drive A:, type FINDFILE *.BAT. When FINDFILE prompts you to insert a disk, put a floppy into drive A: and press any key. If the disk doesn't contain any matching files, FINDFILE says so and prompts you for another disk. Otherwise, it displays all the files on the disk that match your search criteria and asks if you want to search more floppies for the same files. Once FINDFILE has located the files you want, it returns you to the command prompt.

Note: If you don't have DOS 6.0, you don't have the CHOICE command, but you can still use the batch file. Just replace the four lines beginning with ECHO. and ending with GOTO LOOK with a single line that reads GOTO END instead.

DYLAN TWENEY
ASSOCIATE EDITOR

Create Multiple Directories with One Command

PC Contact

When you must create an elaborate directory tree, don't waste time typing one MD command after another. Instead, use MAKETREE.COM to create complex directory trees with a single command. Download MAKETREE.COM from PC/Contact's data library 3 (Utilities/Misc.) as MKTREE.ZIP or create it on the command line with the instructions on the following page.

CONTINUED ON PAGE 372

F1 key. The ANSI.SYS codes for other keys are listed in DOS 6.0's online help (type HELP ANSI.SYS) and in the DOS 5.0 manual (see the appendix "Keyboard Layouts and Code Pages"). The *p* at the end of the line must be lowercase.

In AUTOEXEC.BAT, add PROMPT commands that assign the five or six commands you use most often to function keys. *Note:* Command echoing must be enabled when the PROMPT commands are executed, otherwise the commands have no effect. If you've turned off command echoing with ECHO OFF, you must turn it back on by placing the command ECHO ON before these PROMPT statements in AUTOEXEC.BAT.

Toggle Caps Lock

If your keyboard were more like a typewriter, pressing Shift while Caps Lock was on would turn it off. Make your keyboard do this with AUTOCAPS.COM, a utility you create with a DEBUG script.

Use an ASCII editor to enter this script, and then save it as a text file called AUTOCAPS.SCR:

```
N AUTOCAPS.COM
E 0100 EB 23 00 00 00 00 9C 50
E 0108 E4 60 3C 2A 74 04 3C 36
E 0110 75 0C 1E B8 40 00 8E D8
E 0118 80 26 17 00 BF 1F 58 9D
E 0120 2E FF 2E 02 01 B8 09 35
E 0128 CD 21 89 1E 02 01 8C 06
E 0130 04 01 B8 09 25 BA 06 01
E 0138 CD 21 BA 25 01 CD 27
RCX
3F
W
Q
```

Then, create AUTOCAPS.COM by typing the following line:

```
DEBUG < AUTOCAPS.SCR
```

Next, add the command AUTOCAPS to your AUTOEXEC.BAT file. As usual, include a pathname if the program file is located in a directory on the search path. You can download this program, along with other keyboard utilities, from PC/Contact, *PC/Computing*'s CompuServe forum. Look for KEYBOR.ZIP in data library 1 (Hot Tips/Secrets).

Seizing control of your keyboard doesn't have to be difficult. Take advantage of DOS features to become master of all you type.

/// Hot Tips

CONTINUED FROM PAGE 371

Use a text editor to type these lines exactly as shown. Be sure that there's a blank line after the final Q, and save the file as MAKETREE.SCR:

```
N MAKETREE.COM
E 100 EB 7C 00 00 00 00 00 0D
E 108 0A 43 72 65 61 74 65 64
E 110 20 24 0D 0A 4D 41 4B 45
E 118 44 49 52 20 2D 20 6D 61
E 120 6B 65 73 20 61 6C 6C 20
E 128 64 69 72 65 63 74 6F 72
E 130 69 65 73 20 69 6E 20 70
E 138 61 74 68 0D 0A 55 73 61
E 140 67 65 3A 20 4D 41 4B 45
E 148 44 49 52 20 5B 64 72 69
E 150 76 65 3A 5D 5B 70 61 74
E 158 68 5D 0D 0A 0A 2A 2A 2A
E 160 20 4E 6F 20 44 69 72 65
E 168 63 74 6F 72 69 65 73 20
E 170 43 72 65 61 74 65 64 20
E 178 2A 2A 2A 0D 0A 24 BE B0
E 180 00 AC A3 03 01 83 F8 00
E 188 75 03 E9 B1 00 88 FE 03
E 190 F8 88 25 AC 3C 20 74 FB
E 198 3C 00 75 03 E9 9F 00 4E
E 1A0 88 FE AC 3C 00 74 1F 3C
E 1A8 20 75 F7 B0 00 88 04 8B
E 1B0 CE 2B CF 89 0E 03 01 B8
E 1B8 80 00 8A 0E 80 00 B5 00
E 1C0 03 C1 3B F0 75 78 B0 24
E 1C8 88 04 4E 88 24 89 3E 05
E 1D0 01 88 3E 05 01 B0 5C 88
E 1D8 0E 03 01 FC F2 AE 75 2F
E 1E0 88 16 05 01 4F B0 00 88
E 1E8 05 B4 39 CD 21 72 19 B1
E 1F0 01 88 0E 02 01 B4 09 BA
E 1F8 07 01 CD 21 B0 24 88 05
E 200 B4 09 B8 16 05 01 CD 21
E 208 B0 5C 88 05 47 EB C6 8B
E 210 16 05 01 B4 39 CD 21 72
E 218 13 B1 01 88 0E 02 01 B4
E 220 09 BA 07 01 CD 21 88 16
E 228 05 01 CD 21 BA 07 01 B9
E 230 02 00 B4 40 CD 21 80 3E
E 238 02 01 00 74 01 C3 B4 09
E 240 BA 12 01 CD 21 C3
RCX
146
W
Q
```

Type DEBUG < MAKETREE.SCR at a command prompt to create MAKETREE.COM.

To use MAKETREE, type MAKETREE followed by the directory tree you want to create. For example, the command MAKETREE NOVEMBER\BUDGET\RESEARCH creates that nested directory tree below the current directory.

MICHAEL LEW AND GREG MARTIN
URBANA, ILLINOIS

Clean Up After DoubleSpace

DOS 6.0's DoubleSpace is easy to use—but if you want to remove it, it's not easy to get rid of. DoubleSpace takes up more than 40K of precious RAM, even after you've eliminated it from your CONFIG.SYS and AUTOEXEC.BAT files.

To remove DoubleSpace from your system, first transfer any files on compressed drives to your hard disk's uncompressed partition or to floppy disks. Then remove any references to DBLSPACE.SYS and DBLSPACE.COM from your CONFIG.SYS and AUTOEXEC.BAT files. Any LOAD, LOADHIGH, or LH lines in AUTOEXEC.BAT that specify a DBLSPACE file should also be deleted.

Even after you remove these lines, DoubleSpace isn't eradicated. If you reboot and type MEM /C | MORE, you'll see that DBLSPACE still consumes 43K. To remove it, switch to your root directory and type:

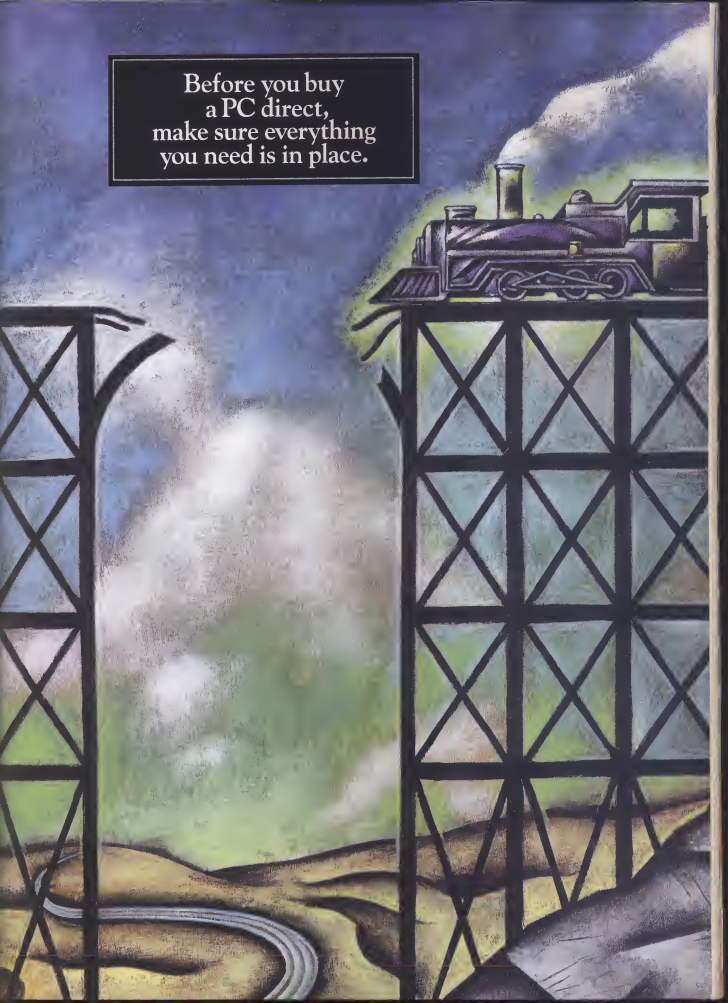
```
ATTRIB DBLSPACE.* -S -H -R
```

Then delete all DoubleSpace files by typing the following line:

```
DEL DBLSPACE.*
```

When you reboot, DoubleSpace will be gone at last.

DYLAN TWENEY
ASSOCIATE EDITOR


Before you buy
a PC direct,
make sure everything
you need is in place.

Inmac Insignia 450SL

Now for only $1299 you can get the kind of system and support that you always wanted but couldn't find elsewhere. Inmac Insignia 450SL provides you with the assurance of Inmac's superior customer service and support and the compatibility and reliability of a CPU built by IBM. Add to that system performance, **over 30% faster** than comparable i486SX/25 systems and you see what we mean when we say everything you need is in place at Inmac.

Inmac Insignia 450SL Features:

- IBM 486 SLC2 25/50 MHz CPU with 16 KB internal cache.
- 4MB RAM upgradeable to 32 MB.
- 120 MB HD.
- 14", .28mm pitch, NI Flicker free, 1024 x 768 SVGA Monitor.
- 5 ISA slots and 4 Bays (one internal 3.5", one external 3.5" and two external 5.25")
- One parallel and two serial ports.
- 32 Bit accelerated local bus SVGA with 1 MB video RAM.
- Free lifetime technical advice and product support 24 hours a day, 7 days a week.
- Guaranteed* on-site service is included the first year.
- Also includes keyboard, mouse, DOS 6.0, Windows 3.1, QAPlus, and Lotus Organizer.

Inmac Insignia 450SL
$1,299.
L1001PC

Special Introductory Offer

Get the Inmac Insignia 450SL system pre-loaded and configured with Windows versions of

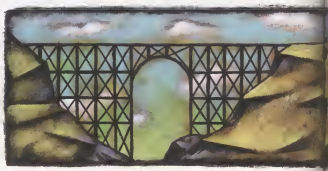
- WordPerfect
- Quattro Pro
- Microsoft Money
- Internal 9600 Baud Fax/Modem
- QuickLink II

$1,699.
L1014PC

You get $1,400 in software for just $400 more. **That's a $1,000 savings.** Act now, offer expires Nov. 30, 1993.

INTRODUCING

486 PCs Built by IBM. LOA



Two of the biggest names in computin Inmac and IBM, have at last, closed the ga between the promise of PCs purchased direct and th solution they're supposed to provide. It's called Inm Insignia and it combines the proven reliability of 4 systems built by IBM, with Inmac's 17 years of superi customer service, broad PC & network product sele tion and exceptionally low prices.

KEEP ON TRAC

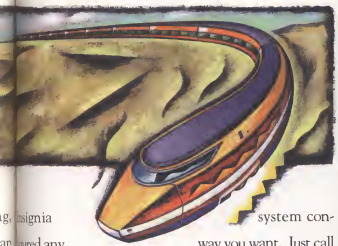
No more technical snags or missing links that ca derail your productivity plans. As the world largest direct marketer of computer supplies, soft ware and peripherals, Inmac stocks well over 6,00 products. This wide selection, combined with ou complex systems and networking expertise, assure you of the absolute best and most complete solutio for your situation. Installed. Tested. And ready t go from day one.

CHOOSE YOUR ENGINE

Order one of our standard configurations and we' ship it the very next day.** Or, have your Inma

MAC INSIGNIA.™

PRICED LOW AND READY TO ROLL.



g, nsignia system con-
ap gured any way you want. Just call
he ow or fill out and fax the form on the back. We'll pro-
ac vide an instant quote. Give us the signal, and we'll cus-
86 tomize and ship in just a few more days. It's that easy.

ior SATISFACTION GUARANTEED

ec- If you're not satisfied with an Inmac product, return it
for a full refund or credit of the purchase price. All
K Inmac Insignia computer systems have a full one-year
an warranty that includes guaranteed on-site service.*

d's GET ON BOARD NOW

ft- To order, call 1-800-547-5444 now. We'll have you
00 up to speed in no time.

inmac
INSIGNIA™
1-800-547-5444

Order Today, Ship Tomorrow®*

We accept Visa, MasterCard, Discover, or American Express.
Corporate buyers are welcome to set up an open account. Call for details. *Ger service when it was promised, or we'll credit $25 on your next Inmac purchase over $100. **Order any standard configurations by 5 PM Central Time, M-F and we will ship to you the very next business day.

1-800-547-5444

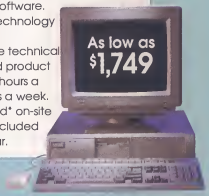
PRIORITY CODE: L14213. Please use your priority code when ordering.

Inmac Insignia Professional Series

For serious computing power, Inmac Insignia Professional Series brings everything you need for prices as low as $1749. Every Inmac Insignia comes with free 24-hour, 7 days a week technical support, and more. All systems are delivered installed, tested and ready to run. Get all this and the compatibility and reliability of a CPU built by IBM for Inmac by simply calling Inmac, today.

Inmac Insignia Professional Series Features:

- Choice of 486 DX/33 MHz, 486 DX2/50MHz, or 486 DX2/66MHz CPU all with internal math co-processors and 8KB internal cache.
- 4MB RAM, upgradeable to 64 MB.
- 170 MB HD.
- 5 ISA slots and 4 Bays (one internal 3.5", one external 3.5" and two external 5.25")
- 14" .28mm pitch, NI Flicker free 1024 X 768 SVGA monitor.
- 32 bit accelerated local bus with 1 MB display RAM.
- Enhanced 101-key keyboard, mouse, one parallel and two serial I/O ports.
- DOS 6.0, Windows 3.1, QAPlus, Lotus Organizer software.
- Pentium™ technology ready.
- Free lifetime technical advice and product support 24 hours a day, 7 days a week.
- Guaranteed* on-site service is included the first year.



Inmac Insignia 433P	486 DX/33 System	L1002PC	$1,749.
Inmac Insignia 450P	486 DX2/50 System	L1003PC	$2,049.
Inmac Insignia 466P	486 DX2/66 System	L1004PC	$2,199.

Special Introductory Offer

Get the Inmac Insignia 450P system with additional 4MB of RAM (for a total of 8MB), and Windows versions of

- WordPerfect
- Quattro Pro
- Porodox
- Central Point PC Tools

$2,599. L1015PC

$1,900 worth of software for just $500 more. **That's a $1,400 savings off list price.** Everything you need is installed, tested and ready to go. This offer expires Nov. 30, 1993, so call today.

INMAC INSIGNIA "BUILD TO ORDER" FAX QUOTE

FAX: 1-800-972-3210 CALL: 1-800-547-5444

PRIORITY CODE: L14213.

Please use your priority code when ordering.

Get a great price quote on an Inmac Insignia system by simply filling out and faxing back this form. Whether you order a standard or a customized package, each system is fully configured and tested with software loaded and ready to run.

Please contact me with an estimate ASAP.

Name _____

Title _____

Company _____

Phone _____ Fax _____

Street Address _____

City _____ State _____

ZIP _____ Country _____

Describe here what you will expect your system to do:

_____

_____

_____

Simply choose from the menu below and fax this form to us for an instant price quote.

SYSTEM
Each system is preconfigured with four drive bays; five ISA expansion slots; two serial ports; one parallel port; keyboard; mouse; MS DOS 6.0; MS Windows; Diagsoft QAPlus; Lotus Organizer.

1 ☐ Inmac Insignia 450SL basic system with IBM 486 SLC2 25/50 MHz CPU; 16 KB internal cache.
2 ☐ Inmac Insignia 433P basic system with Intel 486 DX 33 MHz CPU; 8 KB write-thru cache.
3 ☐ Inmac Insignia 450P basic system with Intel 486 DX2 25/50 MHz CPU; 8 KB write-thru cache.
4 ☐ Inmac Insignia 466P basic system with Intel 486 DX2 33/66 MHz CPU; 8KB write-thru cache.

RAM
5 ☐ 4 MB 6 ☐ 8 MB 7 ☐ 16 MB 8 ☐ 32 MB 9 ☐ 64 MB (N/A in 450SL)

MONITORS/VIDEO
10 ☐ SVGA Monitor 14", .28 1024 x 768 NI
11 ☐ SVGA/XGA Monitor 17", .28 1024 x 768 NI

HARD DRIVE (Must check one)
12 ☐ 120 MB
13 ☐ 170 MB
14 ☐ 255 MB
15 ☐ 340 MB
16 ☐ 540 MB*

FLOPPY DRIVE (Must check at least one dual or 3.5")
17 ☐ Dual Floppy Drive 3.5" & 5.25" (single drive bay)
18 ☐ 3.5" Floppy Drive
19 ☐ 5.25" Floppy Drive (as second drive)

ADAPTER
20 ☐ SCSI Adapter
21 ☐ ORCHID Farenheit 1280° Plus

SOFTWARE
We will install the latest version available at time of shipment.

WORD PROCESSING
22 ☐ Microsoft Word for Windows
23 ☐ WordPerfect for Windows
24 ☐ Lotus Ami Pro for Windows

SPREADSHEETS/FINANCE
25 ☐ Microsoft Excel for Windows
26 ☐ Lotus 1-2-3 for Windows
27 ☐ Borland Quattro Pro for Windows
28 ☐ MS Money

DATABASE MANAGEMENT
29 ☐ Borland Paradox for Windows

PRESENTATION GRAPHICS
30 ☐ Microsoft Powerpoint for Windows
31 ☐ Lotus Freelance for Windows

UTILITIES
32 ☐ Central Point PC Tools for Windows

INTEGRATED OFFICE APPLICATIONS
33 ☐ Microsoft Office: Word, Excel, Powerpoint, Mail
34 ☐ Lotus Smart Suite: Ami Pro, 1-2-3, Freelance, cc: Mail
35 ☐ Borland Office: WordPerfect, Quattro Pro, Paradox

NETWORKING
36 ☐ 3COM Etherlink III Combo (AUI, TP, BNC)
37 ☐ IBM 4/16 ISA Token Ring Adapter
38 ☐ Internal 9600/2400 Baud FAX/MODEM
39 ☐ Internal 14.4 Baud FAX/MODEM

MULTIMEDIA
40 ☐ Internal CD-ROM Drive
41 ☐ Creative Labs Sound Blaster 16**
42 ☐ Media Vision Pro Audio Spectrum 16**

* Requires SCSI adapter
**Headsets included

Call Us Toll Free 1-800-547-5444
Fax Us Toll Free at 1-800-972-3210

P.O. Box 168065, Irving, Texas 75016-9901 • 1-800-547-5444

Note: For Canadian Customers Please Call 1-800-567-5992

inmac INSIGNIA 1-800-547-5444

Copyright 1993, Inmac Corporation. Inmac Insignia and Inmac are a trademark and registered trademark respectively of Inmac Corporation. IBM is a registered trademark of IBM Corporation. All other products or service names mentioned are trademarks of their respective owners.

Choosing the Best Modem is EZ!

Easy to Buy. The Complete Communicator EZ gives you data, fax and voice mail communications for the price most others charge without voice capability. For under $100, you'll get everything you need to be up and running fast — including the industry's best fax, data and voice software.

Easy to Install. The internal version is easy to install because the fax, data and voice capabilities are all on one card. Or just plug the external unit into your serial port. The simple software installation will get you up and running in less than 10 minutes.

Easy to Use. We've made the software for Windows and MS-DOS the same for our modem, so you won't have to learn two different programs. You can fax directly from either DOS or Windows applications. Plus, faxes and voice messages are received and sent in the background — so you can work uninterrupted.

Easy to Choose. With features like remote message and fax retrieval, personalized fax coversheets, 999 password-protected mailboxes and beeper notification, the choice is clear. Complete Communicator EZ takes care of all your communications needs for less than the cost of a standard fax/data modem. So whether you're in the office or on the road, Complete Communicator EZ keeps you in touch with the rest of the world.

From the company that continues to bring you high quality products at great prices.

TheComplete PC®

High Quality Communication Solutions

Copyright © 1993, The Complete PC, Inc. The Complete PC and Complete Communicator EZ are trademarks of The Complete PC, Inc. Other product names or company names mentioned are trademarks or registered trademarks of their respective companies

Circle 207 on reader service card.

Diagnose Application Errors with Dr. Watson

THIS UNDOCUMENTED UTILITY IS ALREADY ON YOUR HARD DRIVE. PUT IT TO WORK. **BY BRIAN LIVINGSTON**

ONE OF THE more powerful tools you can use to improve Windows' reliability is unknown to most Windows users. You can really make Dr. Watson work for you once you've learned the meaning of its hidden codes.

There's a small executable file in Windows 3.1 with the filename DRWATSON.EXE. Microsoft used Dr. Watson extensively during the Windows 3.1 betatesting program to capture valuable information about bugs. This utility probably now lies dormant in your Windows directory, and no information about it appears in your Windows manual.

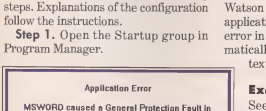
When running, Dr. Watson writes information to a text file whenever a Windows application crashes. In Version 3.0 of Windows, these crashes were called unrecoverable application errors (UAEs). In Windows 3.1, they're known as general protection faults (GPFs) or application errors, but the concept is the same. In each case, an application has done something that isn't allowed by Windows, usually because of a bug that exists in the application.

With Dr. Watson, you can isolate and correct some of the most elusive and maddening bugs that plague your applications. Here's how to use it.

Configure Dr. Watson

To get started using Dr. Watson, I recommend that you take the following steps. Explanations of the configuration follow the instructions.

Step 1. Open the Startup group in Program Manager.



If you regularly see error messages like this, add drwatson.exe to your Startup group.

Step 2. Click on File, New, OK to create a new icon in the Startup group. In the Properties dialog box, type DRWATSON.EXE in the Command Line box. Leave all other boxes blank, and click on OK. Program Manager should find DRWATSON.EXE in your WINDOWS directory and automatically display the Dr. Watson icon in your Startup group (if it doesn't, click on the Browse button in the Program Item Properties dialog box and find it manually).

Step 3. Open WIN.INI in Notepad. Click on Search, Find. In the Find dialog box, type [DR. WATSON] and click on OK to begin the search. (Note the space between DR. and WATSON.) If the search does not locate an existing [Dr. Watson] WIN.INI section heading, add it to the end of your WIN.INI files. Add or modify the lines under the heading to read as follows:

```
[Dr. Watson]
SkipInfo=Time
ShowInfo=Paramlog
```

Without the SkipInfo line, Dr. Watson produces so much information that it is hard to analyze. And without the ShowInfo line, Dr. Watson doesn't produce some information that can be very useful in tracking application errors.

Step 4. Save the changes to WIN.INI and exit Notepad. The next time you start Windows, you should see a Dr. Watson icon on your icon line. When an application causes a GPF or application error in Windows 3.1, Dr. Watson automatically records the information in a text file called DRWATSON.LOG.

Examining the Logs

See "How To Diagnose Dr. Watson's Logs" on page 379 for an example of a log file, and how to interpret it. The example shows an error that occurred when Microsoft Word for Windows 2.0 called the Hewlett-Packard LaserJet III PCL printer driver. The problem, which actually happened, occurred when the driver tried to read outside the boundary of a previously allocated memory segment. The log file shows the exact segment, in hexadecimal notation, of the driver software where the error occurred.

Armed with specific information like this, you can contact the developer of the Windows application to find out how to solve a problem. I resolved the difficulty in this example by replacing Windows 3.1's LaserJet III driver with a newer version I found on CompuServe in the Microsoft Software Library.

To replace the LaserJet driver yourself, log on to CompuServe, and type GO MSL to access the Microsoft Software Library. Select Download a File, and choose HPPCL5.EXE, UNIDRV.EXE, and WDL.TXT. Place the files in a directory other than your Windows directory. At any DOS prompt, run each EXE file once. They are self-extracting compressed files that contain driver software and explain how to install it. WDL.TXT contains a list of the more than 200 Windows drivers that have been updated since April 1992. If you don't have a CompuServe account, you can call Microsoft's Windows support line at (206) 637-7098.

These are the options and parameters you can use in WIN.INI's [Dr. Watson] section to configure it to suit your needs.

SkipInfo. The SkipInfo line determines which sections will be left out of DRWATSON.LOG.

Adding the Time parameter to the

Winapp of the Month

VB System Information

If you wonder exactly what kind of hardware is under your PC's hood, this is the utility for you. It reports the BIOS manufacturer and date, the amount of memory installed, and much more. Download VB System Information from data library 3 (Hot Tips/Secrets) of PC/Contact as VSI100.ZIP or order it for $10 from Snowy Mountain Software, 10968 126 St., Edmonton, Alberta T5M 0P5, Canada.

Reader Service No. 895 PC/Contact

SkipInfo line prevents Dr. Watson from logging the specific times that you load and exit Windows, which shortens the length of DRWATSON.LOG significantly.

Each of the other SkipInfo parameters corresponds to section titles written as necessary to DRWATSON.LOG. These headings contain shortened names in parentheses—CPU 32 Bit Registers (32bit), for example. SkipInfo parameters are based on the parenthetical names, each separated by a character space on the SkipInfo line. In a typical Dr. Watson log file, the parenthetical section names are: Regs, 32bit, Info, Stack, and Tasks.

Placing the Regs parameter on the SkipInfo line prevents the contents of the CPU registers from being written in DRWATSON.LOG. However, because the contents of the CPU registers are among the most important information available to a programmer trying to isolate a bug, I don't recommend that you add this parameter to SkipInfo.

The 32bit parameter suppresses information about the CPU's 32-bit registers. These are used only by programs, such as Mathematica, that require 386 Enhanced mode to run.

The Info parameter keeps Dr. Watson from logging several mostly unnecessary lines regarding memory pages, reducing the length of the DRWATSON.LOG file and making it more readable. The Info section does, however, include information about the percentage of free system resources (FSR) available in your Windows installation. If you're having a problem that seems to occur only when your FSR falls below a certain percentage, you might want to reinstate the Info section of the report.

The Stack parameter eliminates Dr. Watson's output of the instructions that a program is executing when a GPF occurs. It's one of the most important types of data recorded in a Dr. Watson log, so I don't recommend that you disable it.

Finally, the Tasks parameter keeps Dr. Watson from recording the list of all programs running at the time an error occurs. It's probably OK to suppress this section to save space, unless a program you're having trouble with is more likely to encounter difficulty when other programs are running simultaneously.

ShowInfo. I recommend that you always use the line ShowInfo=Paramlog, which instructs Dr. Watson to print more descriptive information when an application vendor has installed a debugging symbol (SYM) file within the main directory of an application.

The Modules parameter prints a long listing of all dynamic link libraries, fonts, and other program segments that were loaded at the time of an error.

The Locals parameter tells Dr. Watson to print variables and parameters that the faulting program was using.

The Sound parameter directs Dr. Watson to beep when faults occur.

The Errorlog parameter enables more elaborate logging of errors.

The Disassembly parameter instructs Dr. Watson to disassemble and report the address where the fault occurred, along with each program's instructions.

DisLen. The DisLen line determines how many instructions are disassembled (printed in assembly language) in the Stack section of DRWATSON.LOG. Dr. Watson defaults to eight lines, but you can specify DisLen=4, which will make the log easier to read.

DisStack. The DisStack line determines the number of programs from which Dr. Watson attempts to disassemble instructions. Dr. Watson defaults to disassembling two programs. This usually provides all the information you need, but you can go nuts and

How to Diagnose Dr. Watson's Logs

Taken from an actual DRWATSON.LOG file, these lines show the data recorded by Dr. Watson during a general protection fault.

Line 2 says that Microsoft Word for Windows 2.0 made a call that caused an error in the Hewlett-Packard LaserJet III driver (HPPCL5A.DRV). The instruction that triggered the fault was in segment 15 of the driver, at byte 0BBF in hexadecimal notation. This line might also contain a phrase like LABEL+0068, which would mean that the bad instruction was 0068 hexidecimal bytes after LABEL in the program.

Line 3 restates the second line and shows the printer driver read instruction that caused the fault, which in this example was PUSH WORD PTR ES:[BX+1A].

Line 5 shows that the hexadecimal value of the CPU's BX register was 7CAB at the time of the fault. When you add 7CAB to 001A, you get 7CC2.

```
(1)  Dr. Watson 0.80 Failure Report - Tue Sep 21 06:12:06 1993
(2)  MSWORD had a 'Exceed Segment Bounds (Read)' fault at HPPCL5A 15:0bbf
(3)  Disp$MSWORD$Exceed Segment Bounds (Read)$HPPCL5A 15:0bbf
     $push word ptr es:[bx+1a]$Tue Sep 21 06:12:06 1993

(4)  CPU Registers (regs)
(5)  ax=001a  bx=7cab  cx=1890  dx=3bcf  si=7cd3  di=47ce
     bp=0000  sp=0ffe  ss=2fbe  ds=2f9f  es=1a  fl=  O  D  I  S  Z  A  P  C=
(6)  cs = 3c5f   ip=0bf2:1f5f Code Ix,B
(7)  ss = 2f9f   ms:fa000:ffdf Data R/W
(8)  ds = 2c0f      5a:00:0ddf Data R/W
(9)  es = 2bcf      64eb:7:f0f Data R/W

(11) Stack Dump (stack)
(12) Start stack at ss:sp                          ss:bp 2f9f:7a9e
(13) 2c5f:0bce  ff 76 e0                  push word ptr [bp+e0]
(14) 2c5f:0bbc  ff 76 e4                  push word ptr [bp+e4]
(15) (HPPCL5A):15:0bbf)
(16) 2c5f:0bbf  26 ff 77 1a               push word ptr es:[bx+1a]
(17) 2c5f:0bc3  e8 f993                   call near 0589

(18) Stack frame 1 is @21 2:0c66                   ss:bp 2f9f:7ba4
(19) (GDI?3:0c66)
```

Line 10 shows that the memory limit allocated for this application in the ES segment is 7CBF. The error occurred because the printer driver tried to read outside of its allocated memory by 3 bytes (because 7CC2 – 7CBF = 0003).

Line 12 shows that Stack Frame 0—the program running when the error occurred—was the HPPCL5A printer driver, and repeats the address of the problem instruction.

Line 16 provides the assembly language code that triggered the fault.

Line 18 reports that the printer driver was called by an earlier program, Stack Frame 1, which was GDI.EXE (Windows' graphics device interface). The instruction that called the printer driver was in segment 3 at byte 0C66 hex of GDI.EXE. This instruction probably requested that the driver translate some graphical object into the LaserJet III's PCL printer driver.

Only an experienced Windows programmer is likely to understand all the information presented in a Dr. Watson log file. But the information in these files is important because it identifies the instruction that triggered an error. It's important to note, however, that the triggering instruction isn't necessarily the actual source of the problem. Another program may have previously created an incompatibility.

IMPROV 2.1. BECAU
DO NOT ALWAYS TH

There's more than one way to look at data. And chances are good that the Brand Manager's way will be different from the CFO's. And the Corporate Planner's will be different still. And so on.

If you and the people you work with are spending a lot of time rebuilding spreadsheets and reworking data, you should know the good news. It's called Lotus® Improv® and it is unlike any spreadsheet you've ever seen.

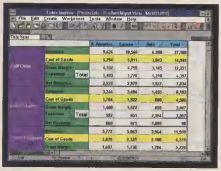
DYNAMIC VIEWS. NOT JUST A NEW FEATURE SET. IT'S A NEW MIND SET.

With its Dynamic Views, Improv lets you rotate, hide, show, collapse and expand worksheets in ways no traditional spreadsheet can. Rather than spending hours reconstructing worksheets to gain new perspectives the new view is created on the spot.

A Regional Sales Manager with a major sporting goods manufacturer uses Improv to track sales activity. Dynamic Views lets her blend sales analysis with market trend data twelve months out and beyond. Improv's flexibility gives her the edge she needs for street-smart decision making.

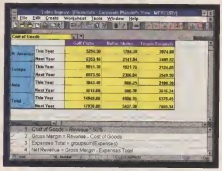
THE ONLY SPREADSHEET THAT SPEAKS YOUR LANGUAGE.

With Improv, you write your formulas in plain English, like 'Gross Margin = Revenue – Cost of Goods.' Besides being more natural than (A10 – B10), this has several big advantages. First, it's easy for anyone you work with to follow the spreadsheet's logic, even if they're looking at it for the first time.



Ever see everyone get what they need from one spreadsheet? Here's the corporate financial data arranged by product.

And the formulas are general, so they can be applied to many cells at once. No matter how much you shift or expand your data, the formulas remain unchanged — there's none of



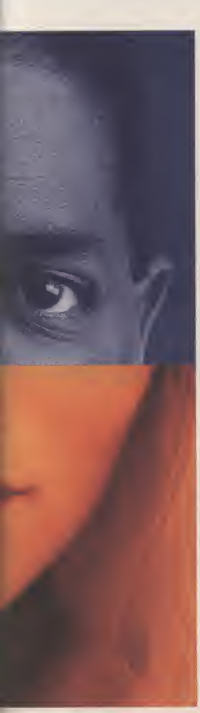
Just drag and drop for a new view, by region. Dynamic Views makes the change instantly.

the cutting and pasting of traditional spreadsheets and none of the potential for error.

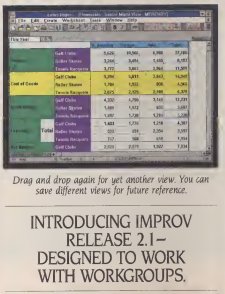
A Market Trends Analyst relies on Improv to lay out trends in demographics and sport

*Anyone who bought Improv Release 2.0 can get the network ready edition of Improv Release 2.1. Wk4 support and the Application Field Exchange features free in an update kit. O+E Extend will not be available at [illegible] Improv for NeXT.® CA Compete and Symphony.® ***In Canada call **1-800-GO-LOTUS** ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, 1-2-3, Lo[illegible] of Microsoft Corporation. Quattro is a regis[illegible]

SE GREAT MINDS
NK EXACTLY ALIKE.

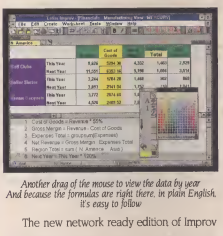


participation and give his people more confidence in their numbers. With Improv there are no cryptic formulas. Everything is spelled out in a way that makes sense. And there's no longer the fear of forgetting to update that one cell.



Drag and drop again for yet another view. You can save different views for future reference.

INTRODUCING IMPROV RELEASE 2.1– DESIGNED TO WORK WITH WORKGROUPS.



Another drag of the mouse to view the data by year And because the formulas are right there, in plain English, it's easy to follow

The new network ready edition of Improv with Q+E Extend* gives you unlimited flexibility to query and access database information. The Application Field Exchange feature enables OLE linking between Improv cells and Lotus Notes® fields. And Improv offers file compatibility with Microsoft® Excel and 1-2-3® files, including the new 1-2-3 Release 4 .WK4 file format. So you can work more easily with your data. And share this data more easily with your colleagues.

A consultant working with management teams uses Improv with Q+E Extend to access over 20 external databases containing sales, production, inventory and payroll information. He can bring data directly into Improv's multidimensional structure with ease, then immediately shuffle the data to see it in a variety of perspectives.

ADD IMPROV TO YOUR SPREADSHEET ARSENAL FOR JUST $199.

Improv has already sold more than 200,000 copies and is hard at work in all kinds of businesses. That's because Improv, as a companion to an existing spreadsheet or as a stand-alone, does some revolutionary things things your traditional spreadsheet was not designed to do. And right now, you can buy Improv as a companion to your existing spreadsheet** for just $199 (SRP). Call: **1-800-TRADEUP, ext. 9136*** for a free demo disk. Or visit your Lotus Authorized Reseller.

Lotus IMPROV

THE FIRST DYNAMIC SPREADSHEET FOR WINDOWS

*le kt just call Lotus with your serial number (510) to cover shipping and handling) **Qualifying spreadsheets include Lotus 1-2-3 for DOS and Windows,™ Excel for Windows, Quattro® Pro for DOS and Windows. ts Symphony and Improv are registered trademarks of Lotus Development Corporation. NeXT is a registered trademark of NeXT Computer, Inc. Microsoft is a registered trademark and Windows is a trademark demark of Borland International, Inc.

specify DisStack=100 if you want to inspect the last few instructions of every application that was running at the time a fault occurred.

GPContinue. By default, Dr. Watson tries to let you continue running a program that has caused a GPF. The line GPContinue=1 simply maintains Dr. Watson's normal behavior. You can use the following values, added to 1, to modify this behavior:

The value 2 tells Dr. Watson to write only a short, three-line report when a GPF occurs.

The value 4 tells the utility to continue even if the fault involves Kernel.

The value 8 tells the utility to continue even if the fault involves User.

For example, to force Dr. Watson to display its Continue Or Ignore dialog box even for serious GPFs in Kernel and User, add the line GPContinue=13 (because 1+4+8=13).

LogFile. The LogFile line lets you provide a different name for DRWATSON.LOG. You can change this line so that Dr. Watson writes to a printer or a debugging terminal. For example, specifying LogFile=LPT1 forces Dr. Watson to write all characters to the printer on LPT1.

TrapZero. If you experience "Divide by zero" error messages, insert the line TrapZero=1 to make Dr. Watson trap them along with other errors.

A Few Idiosyncrasies

Beware of Dr. Watson's quirks. The utility writes complete information for only the first 3 faults you encounter. To save disk space, it writes only a brief summary of the next 17 faults. After 20, Dr. Watson won't record more information until it resets itself the next time you start Windows.

Dr. Watson warns you when the DRWATSON.LOG file is larger than 100K. You may want to rename DRWATSON.LOG periodically, perhaps with a date name like 11-30-93.LOG, to keep a summary of all the difficulties that you encounter.

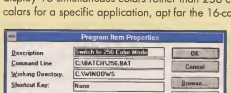
Don't use a version of DRWATSON.EXE older than March 10, 1992, with Windows 3.1. All prior versions were beta code and are not fully compatible.

Finally, some error conditions might occur in Windows that Dr. Watson

Hot Tips

Switch Video Modes Instantly

You'll get faster Windows video performance if you configure Windows Setup to display 16 simultaneous colors rather than 256 colors. Unless you need the extra colors for a specific application, opt for the 16-color mode. And to simplify switching between video modes, create a pair of Program Manager icons that allow you to make the switch with a double-click.



First be sure that you're using a 16-color display, then open File Manager and select SYSTEM.INI in your WINDOWS directory. Press F8 to copy it, specify SYSTEM.16 as the file to copy to, and click an OK. Use Windows Setup in order to change your display to the 256-color (or higher) display you want, then exit and restart Windows. After you make the switch, copy SYSTEM.INI again, this time to a file called SYSTEM.256.

Next, create a pair of batch files to switch SYSTEM.INI files automatically. Open Notepad, and enter the following lines in a new file:

```
COPY SYSTEM.INI SYSTEM.16
COPY SYSTEM.256 SYSTEM.INI
```

Save this file as 256.BAT, then choose File, New to start a new text file. Type the following two lines in the new file:

```
COPY SYSTEM.INI SYSTEM.256
COPY SYSTEM.16 SYSTEM.INI
```

Save this file as 16.BAT. Then create two Program Manager items, one to run each of the two batch files. For both program items, specify your WINDOWS directory as the Working Directory. To switch to a 16-color display, double-click on the icon that runs 16.BAT, then exit and restart Windows. To switch back to 256 colors, double-click on the 256.BAT icon, then exit and restart Windows.

LENNY BAILES
SAN FRANCISCO, CALIFORNIA

DOS 6.0's Undocumented SmartDrive Monitor

Want to know how well SmartDrive is caching your disk reads and writes? Or how to control SmartDrive from within Windows? Use SmartDrive Monitor, an undocumented Windows program that comes with DOS 6.0. To run the SmartDrive Monitor from Program Manager, choose File, Run, type SMARTMON.EXE, and then click on OK.

The monitor features a cache performance log, so you can see how well SmartDrive is doing. Click on Start Log to begin recording the log. SmartDrive Monitor also lets you adjust which drives are cached and whether they're read- or write-cached. Want to flush the cache? Click on the Commit button to force SmartDrive to update the disk with any cached data that has yet to be written to disk. Click on Reset to flush the cache as well as clear it.

ERIK OLBRYS
STAMFORD, CONNECTICUT

Hey! You're *Shelled* to DOS!

Once you've shelled out to a full-screen DOS session, it's easy to forget that Windows is still running. Add the following line to your AUTOEXEC.BAT file, and you'll always have a reminder that Windows is in the background. Enter

CONTINUED ON PAGE 384

MULTIMEDIA TO DAZZLE YOUR SENSES.

(INCLUDING YOUR SENSE OF STYLE.)

Introducing Memphis.™ The all-in-one multimedia machine that brings your computer to your senses. Your ears will experience 16-bit CD-quality sound through its detachable, powered speakers. For your eyes, the smooth animation and video streaming off its double-speed CD-ROM drive. And because you can use Memphis as a stand-alone CD player, it will appeal to your sense of play.

PC2 Multimedia PC

So crank the volume, select a new track or stop play without even touching your computer. And for your mind? The assurance of industry leading hardware that exceeds MPC2 standards and includes Sound Blaster™ compatibility. Memphis is a unique combination of elegance and function with a design that's made for your sense of style. So encounter Memphis-it will transform your perception of multimedia.

For more information or a dealer near you call **1-800-845-5870.**

MEDIA VISION

© 1993 Media Vision, Inc., 3185 Laurelview Court, Fremont, CA 94538 (510) 770-8600 Fax (510) 770-9592
Memphis is a trademark of Media Vision, Inc. Any other trademarks and registered trademarks are owned by their respective holders.

Circle 154 on reader service card.

cannot trap, which is why Microsoft still considers Dr. Watson to be Version 0.8, not even Version 1.0.

Put the Good Doctor to Work

Metz Software (800-447-1712) is one company that looks for user feedback on Dr. Watson activity that may be triggered by its applications. Art Metz, the company's president, says the company ships SYM files with some finished applications to help annotate DRWATSON.LOG. The company also provides SYM files to any user who is having difficulty with Windows and its applications.

Metz Software is the publisher of File F/X (a Windows shell), Metz Lock (a password-protection program), and many other Windows utilities. I use at least one of these utilities almost every day, and perhaps because of the company's use of Dr. Watson, I have never encountered a bug in its applications.

Microsystems Technology (813-254-3200) distributes a policy sheet to its developers to help them track the line of code referenced in a Dr. Watson report. The company routinely uses EXEHDR, a C compiler utility, to locate the address of segments cited by Dr. Watson.

Microsoft itself doesn't guarantee that it will follow up on Dr. Watson reports, but the company has checked out repeatable cases of application errors in Windows and Windows programs. Microsoft accepts Dr. Watson logs only in electronic form. On CompuServe, type GO MSCON to get to the Microsoft Connection, select the proper region, select Developer Services, and post your comments.

Windows developers should check the May-June 1992 issue of the *Microsoft Systems Journal* for more information on debugging with Dr. Watson.

Dr. Watson can help clear up some mysterious annoyances, so you can go back to enjoying Windows—the way you always wanted.

Brian Livingstan is the author of *Windows 3.1 Secrets* (1992) and *More Windows Secrets* (1993) and a co-author of *Windows Gizmos* (1992), all published by IDG Books. Write to him at Help, *PC/Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404.

Hot Tips

CONTINUED FROM PAGE 382

all the listed characters on one line exactly as they appear in this command string:

```
SET WINPMT=$e[s$e[f$e[0;30;46m$e[K Windows is Active$e[24CAlt+Tab
  to switch; type EXIT to close$_$e[0;40;37m$e[K$e[u$e[B$P$G
```

If you don't already have ANSI.SYS loaded, you must add this line to CONFIG.SYS:

```
DEVICE=C:\DOS\ANSI.SYS
```

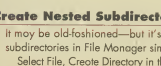
Reboot your computer. The next time you shell out to DOS from Windows, an aqua-colored strip across the top of the screen reminds you that you are in a DOS session running under Windows.

SEAN HAMMOND
HAVERHILL, NEW HAMPSHIRE

Create Nested Subdirectories Fast

It may be old-fashioned—but it's definitely fast. You can quickly create nested subdirectories in File Manager simply by typing them in.

Select File, Create Directory in the Windows File Manager, and type in the name of a series of nested subdirectories, such as C:\PROPOSAL\DATA\DOCS. File Manager creates all the subdirectories at once.



Tired of that branch of the directory tree? Select the topmost directory you want to delete and press Del to remove it, its subdirectories, and any files they contain.

RONNY RICHARDSON
CHAMBLEE, GEORGIA

Get the Doctor to Make House Calls

Brian Livingston's tips for using Dr. Watson to help monitor Windows application errors could really save you a lot of aggravation when your applications aren't doing what they're supposed to (see "Diagnose Application Errors with Dr. Watson," page 379). The only warning you may get before all is lost—or that there's something wrong with an application installation or configuration—could come from this useful undocumented utility.

But what's the best way to put Dr. Watson to work? If you're having trouble with your system, you may see lots of annoying messages warning you that Dr. Watson's log of recorded error information is getting too large. You can more easily monitor additions to the log and control its size by taking a couple of quick steps to make accessing and editing the log a snap.

Make an icon for the Dr. Watson log text file that links it to Write. Start by opening the Program Manager group in which to place the icon. Next, choose File, New, and click on OK. In the Description field, type:

```
Dr. Watson Log
```

In the Command Line field, type:

```
WRITE.EXE DRWATSON.LOG
```

Then press Change Icon, type C:\WINDOWS\DRWATSON.EXE in the File Name field, and click on OK twice.

Now whenever the good doctor prompts you about an error or notifies you that the error log is getting too big, click on this icon to quickly call up the log. And because the log is editable, you can get rid of messages you don't want to save. Newly logged problems will continue to be appended to the end of the file.

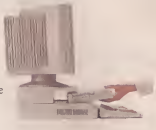
SCOT FINNIE
SENIOR EDITOR

Two PCMCIA 2.01 Slots, Type II (5mm) and 16mm: Twice the expandability. Easily accepts multiple cards including hard disk drives, modems and networking adapters.

LCD Status Bar: Delivers an instant read of the battery life remaining, power-saving mode, and a host of other key notebook settings.

BallPoint™ Mouse with QuickPort™: Attaches easily, without messy cords, for ergonomically ideal input—perfect for Windows® applications.

Replace Your Desktop: Just snap your notebook into the Desk Station IV, and you're instantly connected to your printer, VGA monitor, mouse, and full-size keyboard. Now you only need one computer.



Some say the T4600 is better than life itself. Because in life, there is compromise.

Introducing the T4600 Series. Make no compromise.

Get the awesome power of a 33MHz i486™SL processor, and don't sacrifice battery life. Add a 9.5" color active matrix TFT-LCD screen, and access all 185,193 eye-popping VGA colors. Pack a massive 320MB hard drive and never have to leave a file at home. Get your hands on the BallPoint™ mouse, snap it into its QuickPort™, and never waste a moment or a motion.

Carry two slots for industry-standard PCMCIA cards—including one large enough for the new generation of removable hard drives—and take the next big step in peripherals.

Glance at the QuickRead LCD status icon bar for an instant read of battery life, power management, keyboard settings, and more. This is no time for compromise. This is the time to get your hands on the T4600 Series.

For a dealer near you, call 1 (800) 457-7777.

33 MHz intel inside i486™SL

Blazing 33MHz i486™SL: With built-in coprocessor support, delivers the ultimate in notebook processing power.

T4600C
- 9.5" color active matrix TFT-LCD screen
- 120/200/320MB HDD
- 6.9 lbs.
- NiMH battery

T4600
- 9.5" high-contrast, black and white LCD screen
- 120/200MB HDD
- 6.4 lbs.
- NiCd battery

BOTH MODELS
- Intel 486SL/33MHz, 3.3 volt processor with 8K cache
- 4MB RAM expandable to 20MB
- Two PCMCIA 2.01 slots, Type II (5mm) and 16mm
- Toshiba MaxTime™ Power Management system.
- Pre-installed software: DOS 6.0, Windows® 3.1, and UltraFont™.

intel inside

In Touch with Tomorrow

TOSHIBA

Circle 215 on reader service card.

© 1993 Toshiba America Information Systems, Inc. The Intel Inside logo is a trademark of Intel Corporation. All products indicated by trademark symbols are trademarked and/or registered by their respective companies.

See how COMPEL

COMPEL™ involves and keeps your audience interested like no other presentation software can. See how you can transform this plain fact sheet into a powerful story:

DRAMATIZE.

Use COMPEL to illustrate this point with a video clip. You can do it from one dialog box, without switching programs.

INTERACT.

With COMPEL, you can link any bullet to more detailed information. Just click on it to show what your audience is most interested in.

COMPAQ LTE Lite 4/33c

TAKE IT WITH YOU.

Want to take your show on the road? Only COMPEL will package, compress and copy it with all its components. You won't have to worry about missing files.

COMPEL Facts and Features

INTEGRATED MULTIMEDIA

- Play digital video; wave, CD and MIDI audio; Autodesk® animations and video-disc clips, all within *COMPEL*.
- Add motion to any object with *COMPEL*'s built-in animator.
- Annotate bullet points with a one-step sound recorder.
- Choose from over 100MB of sound, video, animation and clip art; 34 slide transitions and 9 bullet animations.

AUDIENCE INTERACTION

- Easily create links to other slides, presentations and applications.
- Find and jump to any slide with the TwinClick™ pop-up navigation panel.
- Link and embed OLE objects.

PORTABILITY

- Package and distribute presentations that customers can run on their own computers, even if they don't have *COMPEL*.
- Verify that all your presentation files are in place with the Check Media Links utility.

EASE OF USE

- Choose from 100 professionally designed templates and 11 slide styles.
- Create any of 34 chart types.
- Automatically create a series of linked slides with Autobuild.
- Take advantage of extensive on-line help and free technical support.

Asymetrix, the Asymetrix logo, COMPEL, and TwinClick are trademarks of Asymetrix Corporation, and Asymetrix is a registered trademark in the U.S.A. and may be registered in certain other countries. Software Digest is a registered tradema
**Competitive upgrade price. We'll ask for the serial number of your presentation software. Shipping/handling extra. Suggested retail price for COMPEL is $295. Offer good through 3/31/9*

brings your facts to life.

- Use familiar, point-and-click graphics and text tools.
- Create slides, overheads and on-screen presentations, complete with speaker notes and audience handouts.

"My overall favorite is COMPEL, with its excellent user interface, powerful selection of presentation features, and multimedia functionality."
—Presentation Products, 8/93

"COMPEL offers users a solid presentation package comparable to Freelance or PowerPoint – with the advantage of more multimedia power."
—PC Week, 4/93

"For making multimedia easy and practical for business presenters, we award Asymetrix COMPEL the Windows Watcher Innovation Award."
—Windows Watcher, 3/93

DON'T SWEAT.
You can create presentations the same way you do now. Even adding multimedia is easy.

Click on icon to listen to review

LISTEN.
If this were a COMPEL presentation, you could hear the reviewers' comments!

Try risk-free for only

$99*

Here's how to find out if *COMPEL* is right for you. For $99*, we'll send you the complete program with documentation, 100MB of multimedia and full reprints of independent magazine reviews. If you don't agree *COMPEL* can raise your presentations to a new level, send it back within 90 days for a full refund.

24 hours a day, 7 days a week

COMPAQ Qualified Solution

Software Digest — *Recommended product. Software Digest Ratings Report, Vol 10, No 6 6/93*

Asymetrix™

The Leader in Windows Multimedia

© 1993, a McGraw-Hill company. All brand or product names are trademarks or registered trademarks of their respective companies.
*Compaq Qualified Solution Logo is a trademark of the Compaq Computer Corporation.

MINE YOUR PROGRAMS FOR PRODUCTIVITY BY TAPPING THEIR HIDDEN—AND VALUABLE—RESOURCES.

WORD FOR WINDOWS

KNOW YOUR SYSTEM

Unsure of your system settings? Need a list of all your installed fonts and a display of their character sets? Simply open PSS.DOC, which is included with Word; you'll find the information in the Winword directory. Click on one of the document's buttons to get the information you want. PSS.DOC performs a printer test, develops character-set displays, and generates a font list that includes borders and patterns.

For future reference, save the system settings or font lists that PSS-.DOC generates. The font list is created in a new document, so just choose File, Save and assign a name like 11-4FONT.DOC. The System Information macro sticks its data at the bottom of PSS.DOC. Cut and paste it into a new document, which you can save with a name like 11-04-93.DOC.

MICHAEL ZINGALE
MERCERVILLE, NEW JERSEY

A BETTER EM DASH

Although pressing Alt-0151 produces an em dash (—), which looks better than two consecutive hyphens, Word won't break lines at an em dash. To create a breaking em dash, start a new document using your Normal template and the default character formatting.

Make sure Num Lock is on and all nonprinting characters are displayed. Type a space, press Alt-0151, then type another space. Select the first space. Choose Format, Character, Spacing; select Condensed from the drop-down list; and click on OK. Now select the other space, and press F4 (this repeats the Format, Character, and Spacing commands). You now have an em dash with a barely discernible space on either side of it.

Select all three characters and choose Edit, Glossary. In the Glossary Name box, type two hyphens and click on Define. In order to enter a breaking em dash, simply type the double hyphen and press F3. When you exit Word, save the changes to your glossary.

WILLIAM MOORHEAD
IOWA CITY, IOWA

GET YOUR ASCII IN GEAR

If you often retrieve documents from an e-mail service, you can use a macro that removes the hard returns at the end of each line in an ASCII file. To create the macro, select Tools, Macro; type GraphStrip in the Macro Name field; and click on Edit. Type:

```
Sub MAIN
EditReplace .Find = "^p ^p",
  .Replace = "^p^p", .WholeWord =
  Ø, .MatchCase = Ø, .Format = Ø,
  .ReplaceAll = 1
EditReplace .Find = "^p^p",
  .Replace = "^p^n", .WholeWord =
  Ø, .MatchCase = Ø, .Format = Ø,
  .ReplaceAll = 1
EditReplace .Find = "^p", .Replace
  = " ", .WholeWord = Ø, .MatchCase
  = Ø,
.Format = Ø, .ReplaceAll = 1
EditReplace .Find = "^n", .Replace
  = "^p", .WholeWord = Ø,
  .MatchCase = Ø, .Format = Ø,
  .ReplaceAll = 1
End Sub
```

If any command is too long to fit across your screen, type a backslash (\) where the line breaks, and continue the command string on the next line.

Save and close the macro. To use it, open an ASCII file you want to clean up and choose Tools, Macro; highlight GraphStrip; and click on Run.

CYNDY BATES
ASSOCIATE EDITOR

AMI PRO

MASTER PRINT PAGINATION

When printing a series of documents with the Master Document feature, Ami Pro numbers pages sequentially. You can't manually specify a starting page number for each file included in a Master Document, but you can set each file to start over at page 1.

In the first file, insert the desired page-number format, then open the next file. Move the cursor into the header or footer area where page numbers appear, and choose Page, Page Numbering. Select Start on Page, and type 9999 in the Start on Page box. Make sure that Start with Number is *not* selected. Choose a numbering style, type any text you want to precede the page number, then choose OK. Repeat these steps for the remaining documents.

GEORGE BEINHORN
CONTRIBUTING EDITOR

OMIT PARAGRAPH NUMBERS

You're creating a list by using a style that numbers each paragraph, but some items in the list have more than one paragraph. How do you omit numbering for those paragraphs? Easy—press Ctrl-Enter instead of Enter to create a new paragraph. All paragraph-style formatting is assigned to the new paragraph, with the exception of the specs for Paragraph Spacing Above, Paragraph Spacing Below, and Bullets & Numbers.

To add spaces between unnumbered paragraphs, create a new style that's based on the numbered style. Press Enter several times between paragraphs, and assign the unnumbered style to the extra "paragraphs."

GEORGE BEINHORN
CONTRIBUTING EDITOR

BRACKETING YOUR BULLETS

Ami Pro easily places a period or a close parenthesis or bracket after a number when it formats automatically numbered lists. But what if you want to place parentheses or brackets around a number, as in (16)? Here's a technique that sets off numbers with (), {}, or [] characters. *Note:* This tip does not work with angle brackets (<>).

Begin by modifying a paragraph style that doesn't have numbers specified. Choose Style, Modify Style. Choose a style from the pull-down menu, and under Modify choose Bullets & Numbers. In the Before Paragraph box, select Number. Next to the Text check box, type the trailing character that you want Ami Pro to use for formatting numbers—for example, a close bracket. Then click on OK. Choose Style, Modify Style,

Bullets & Numbers again, and deselect Number. Select the Text check box, and type the opening character in the Text box—for example, an open bracket. Select Number and click on OK. Ami Pro surrounds the numbers in your list with brackets.

GEORGE BEINHORN
CONTRIBUTING EDITOR

LINK CAPTIONS WITH GRAPHICS

Want to anchor captions to graphics in Ami Pro 3.0 documents? Use frames to link graphics with text so that they can be moved and copied as a unit.

Create two frames stacked on top of each other. Highlight one frame, and select File, Import Picture. Choose the file you want from the list, and click on OK. Double-click on the second frame, and type in your caption. Click once on the frame with the graphic to select it, and, while holding down the Shift key, click on the frame with the caption. Select Frame, Group. You can now move the picture and its caption together.

REV. MIKE PASARILLA
DALLAS, TEXAS

WORDPERFECT 5.1

PRINTING ONLY CERTAIN LABELS

If you want to print only some of the labels created using a WordPerfect Label form, use the multipage print option. For example, to print the 1st, 3rd, and 9th through 12th labels, press Shift-F7 (Print), 5 (Multiple Pages), and enter 1,3,9-12.

JUDY HOUSMAN
CAMBRIDGE, MASSACHUSETTS

WHOOPS! I'M IN TYPEOVER MODE

If you discover you've been entering data in Typeover instead of Insert mode, press F1, 1, and everything you typed over will be restored. Now just press Ins to return to Insert mode.

MARK COLEN
SANTA CRUZ, CALIFORNIA

1-2-3

FORMAL DATES

To have the formal date appear in a work sheet, use the following formula to convert a date into a spelled-out date string. For example, the formula converts 05/10/93 to May 10, 1993. Put the formula in cell B1 in order to convert the date in cell A1.

```
@CHOOSE(@MONTH(A1)-
  1,"January","February","March","
  April","May","June","July",
  "August","September","Octo-
  ber","November","December")
  &"&(@string(@DAY(A1),Ø)", &&
  "19"&@STRING(@YEAR(A1),Ø)
```

DOUGLAS BLEYAERT
MONROE, MINNESOTA

QUATTRO PRO

MONTH-YEAR LABEL FILL

Quattro Pro does not have an easy way to generate row labels designating each month over a span of several years. Here is a relatively simple workaround that creates as many as 66 consecutive months for row headings. If you need labels for more more than 66 months, repeat this routine. If you need labels for a period of more than ten years, make a macro of these

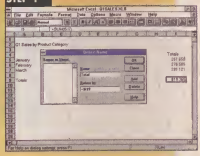
Step by Step: Excel

PUT SUM TOTALS IN YOUR HEADERS

Want to put a spreadsheet total in the header of the printout? Excel won't let you put a formula in the header that totals rows or columns in the spreadsheet. Here's a workaround.

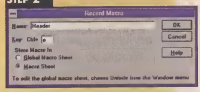
Step 1. Name your sum cell.
Highlight the cell whose total you want to display. Select Formula, Define Name. Type Total in the Name box, and click on OK.

STEP 1



Step 2. Record a macro.
Next, select Macro, Record to start the macro recorder. Name the macro Header, select Macro Sheet, then click on OK. Select File, Page Setup, and press Enter without making any changes. Select Macro, Stop Recorder.

STEP 2



Step 3. Add the total to the macro.
Choose Window, Macro1 to activate the macro sheet. Highlight the cell on the macro sheet that includes the =PAGE.SETUP() function. In the cell display, you'll see something like the following:

```
PAGE.SETUP("&F","Page
  &P",0.75,0.75,1,1,FALSE,TRUE,
  FALSE,FALSE,1,1,100,1,1,FALSE)
```

The first argument ("&F") specifies a default header string that embeds the filename. Replace it with "&RTotal: "&TEXT(Total,"$#,##0") to take the total from the spreadsheet and right-justify it in the header. Save the macro sheet as HEADER.XLM.

STEP 3

Step 4. Update your header.
With the macro sheet open, switch to the original document by selecting Window and double-clicking on the filename. Select Macro, Run, and double-click on HEADER.XLM!Header in the Run Macro box. When you print the spreadsheet, the total appears in the header. If you change data, the header reflects your changes.

REED JACOBSEN
ARLINGTON, WASHINGTON

STEP 4

commands, and repeat it until you've filled as many rows as you need.

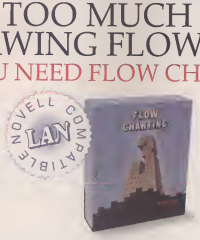
To set up a column of month-year labels (for example, Jan-94) for as many as 66 months, format the range for month-year by pressing Ctrl-F, D, 3. Move your cursor to the first cell, and enter @DATE(*yy,mm*,29). To start your labels with Jan-94, for example, you'd enter @DATE(94,1,29).

Move down one cell, and enter the previous cell's address and add 30 to it. If you had started in cell B3, this entry would read: +B3+30. Now press Ctrl-C, and copy this formula into the rest of the block you had formatted for the labels.

MARK COLEN
SANTA CRUZ, CALIFORNIA

ARE YOU SPENDING TOO MUCH TIME DRAWING FLOWCHARTS?

YOU NEED FLOW CHARTING™ 3.



Every day, professionals worldwide save time and money using Flow Charting 3. It's fast, efficient, easy to use, and always produces presentation-perfect charts and diagrams.

With Flow Charting 3's built-in flexibility, you can create customized charts using a variety of shapes, lines, and text—placed where you want them.

Plus, Flow Charting 3 is now available in a LAN version. Making it easy to share files and set up work groups for specific projects.

And it's backed with free technical support and a 90-day no-risk guarantee. So if you're spending too much time drawing charts, call for a free demo and see for yourself what makes Flow Charting 3 the best-selling flowcharting software.

See your dealer today! Or for a free interactive demo disk, call 1-800-525-0082, ext. 212
International: 408-778-6557, ext. 212

Novell is a registered trademark of Novell, Inc.

PATTON & PATTON
Software Corporation

Excellence in charting the flow of ideas!

Patton & Patton Software Corp. 485 Cochrane Circle, Morgan Hill, CA 95037

Circle 224 on reader service card.

TOGGLE FOR GLOBAL PROTECTION

Global protection keeps your Quattro Pro spreadsheets free from unintentional keystrokes. However, disabling and enabling global protection requires a cumbersome five keystrokes. Use the following macro to toggle between protected and unprotected mode with a single keystroke:

```
 A B
1 '\P    '{IF CURVALUE
  ("protection","status")="Enable"
  }/OPDQ{QUIT}
2    '/OPEQ{QUIT}
3
```

After you type the values in a spreadsheet, press /, T, M, N, and choose Create in order to name the macro. Press /, P, Enter. At the prompt, highlight B1..B3—the cells that contain the macro code, plus an extra blank cell to end the macro. Press Alt-P, and Quattro Pro automatically switches between enabling and disabling global protection.

MARK COLEN
SANTA CRUZ, CALIFORNIA

QUICK AND EASY WHAT-IF

Want to do a quick what-if analysis by forcing a specific condition (such as $0) into a cell that contains a complex formula? Here's an easy way to do it without destroying your formula.

Highlight the cell, press F2 to edit, then press Home. Enter the value or formula you want to temporarily force into the cell, followed by a semicolon, and press Enter. Quattro Pro saves the original contents of the cell as a remark and recalculates the spreadsheet with the new value or formula.

To restore the cell's original contents, highlight it and press F2, Home. Delete all characters through the semicolon, then press Enter.

MARK COLEN
SANTA CRUZ, CALIFORNIA

EXCEL

COLUMNS TO ROWS

Ever added months down the side of a work sheet only to realize you want them across the top? Here's an easy way to transpose column information to rows without rekeying it all.

Select the range that you want to

A Couple of Gigs That'll Play in Peoria.

Introducing PowerTape Series 2400 from Colorado Memory Systems. With up to 2.4 Gigabytes of capacity using data compression, and a native capacity of 1.2 GB, PowerTape 2400 is perfect for backing up a lot of data, even networks, onto one tape about the size of your hand.

At only $1,295 including SCSI controller, software and more, PowerTape 2400 is the best act in the house. And if you're looking for a powerful performance, PowerTape transfers data at up to 18 MB per minute.

PowerTape plays to virtually any crowd. It supports workstation backup from most network operating systems including Novell NetWare®, NetWare Lite™, LANtastic®, 3COM® and IBM® PC-NET. PowerTape is also available in 4 GB models as well as NLM and VAP editions.

Call **1-800-451-0897**, ext. 323 for a FREE 76-page catalog.

POWERTAPE™
SERIES 2400

COLORADO® MEMORY SYSTEMS INC.

© 1993 Colorado Memory Systems Inc. All rights reserved. PowerTape and Colorado are trademarks of Colorado Memory Systems Inc. All other trademarks are property of their respective companies. PTB-PCC030493

Circle 184 on reader service card.

transpose, and choose Edit, Copy. Select a new location for the transposed data (it can be on a new work sheet), and choose Edit, Paste Special. Click on the Transpose check box at the bottom of the Paste Special dialog box. When you click on OK, Excel pastes a transposed copy of the original cells. Excel converts cell references in formulas within the copied range so that the formulas still work. If you used named references in the formulas, you must re-create the names in the new orientation for the formulas to work. Note that you must copy, not cut, in order to use Paste Special. That means you cannot paste the transposed cells over the original location.

REED JACOBSEN
ARLINGTON, WASHINGTON

KEEPING ORDER AFTER SORTS

Excel 4.0 undoes only one level of sorting. If you've been juggling data, how do you get back to where you started? Here's a way to organize your data so that you can sort to your heart's content and then restore its original order.

If your data starts in cell A1, move to column B, and type 1 in B1, 2 in B2, and 3 in B3. Highlight B1..B3, and hold down Ctrl while selecting the fill handle at the bottom right of cell B3. Drag the fill handle to the cell in column B that is on the same row as the last data cell in column A. Excel auto-fills consecutive numbers 4 through *n*.

Highlight both columns, and select Data, Sort. Under 1st Key, select A1 and the type of sort you require, then click on OK. Keep playing with the numbers, always including columns A and B in the sort. To return to your original setup, highlight all the data in both columns; select Data, Sort; set 1st Key to B1; and choose Ascending. Excel uses the numbers you added in column B to restore the original order.

GREGORY MARQUETTE
FOND DU LAC, WISCONSIN

QUICK DATE AND TIME

Need to put the current date and time into a cell? Press Ctrl-; to enter the date, and press Ctrl-: to enter the time. You can use these keys at any point, including in the middle of a formula.

REED JACOBSEN
ARLINGTON, WASHINGTON

A QUICK SELECT ALL

Here's a fast way to select a table in Excel. Choose Format, Auto-Format then click on Cancel. Excel leaves all rows and columns of data selected for formatting. Now you can apply whatever command you want.

VALERIE AMON
FAIRPORT, NEW YORK

TOGGLE FORMULAS AND VALUES

Typically, Excel displays values in a work sheet, and cell formulas in the formula bar. But you can make Excel display the formulas right in the cells.

To toggle Excel's display between

PRINT SERVERS

Ethernet ▪ Token Ring ▪ Arcnet
Pocket size ▪ HP plug-in cards
Netware ▪ TCP/IP

We've packed each model with features, performance, and value. You can't get a better print server for the price.

- Connects your printer directly to your Novell Netware and TCP/IP networks
- Microserv models plug directly into parallel port on any printer
- Lanjet models plug into HP XiO and MIO option slots
- Up to 100,00 characters per second on parallel port
- Serial port can be input to printer or output from network at up to 115.2K baud
- Prints status and configuration at the push of a switch
- Comes with a one-year warranty and unlimited technical support, made in USA

NETWARE FEATURES

- Supports 8 queues on up to 8 file servers
- Automatically locates queues on file servers
- Can notify user of job completion and printer errors
- Supports encrypted passwords
- Shows status via Netware's PSC and PCONSOLE
- Installation program simplifies setup
- Auto detects and uses 802.3 and Ethernet II
- Auto detects and reattaches to new file servers
- Simultaneous queue server and PSERVER

yes
It runs with NetWare

TCP/IP FEATURES

- Finds IP address from BOOTP, RARP, or memory
- Supports LPR, RSh, Rexec, and standard TCP/IP connections to any TCP/IP host
- Configure using Telnet, TFTP, or the serial port
- Supports secure hosts with list of allowable IP addresses and subnet masks
- Notifies user of job completion via SMTP mail
- Notifies supervisor of paper out, off-line, and jobs printed by sending SYSLOG entries
- Shows estimated job completion time and throughput via LPQ command
- Customized banners in PCL or Postscript
- User-defined strings before and after job
- Flash EPROM for easy upgrade to new versions
- Can convert UNIX ascii files to print directly to postscript and non-postscript printers

CALL NOW FOR FREE CATALOG

- Print servers
- Data switches
- Keyboard monitor products

Make the Rose Connection

ROSE ELECTRONICS

10850 Wilcrest Drive ▪ Houston, Texas 77099 ▪ Phone (713) 933-7673 ▪ Fax (713) 933-0044

800-333-9343

Circle 169 on reader service card.

Who says PC buyers can do without?

We do!

NCR
An AT&T Company

Networks Without Wires

Buy one WaveLAN Wireless network card. Get one FREE!

Buy one WaveLAN card and any two selected PCs or notebooks, and we'll throw in the second card FREE!

Get connected with one of the many outstanding communications options available from AT&T/NCR. Showcased here is our award-winning, wireless network that brings you superior flexibility and mobility. Each WaveLAN card comes with software drivers, utilities and an omni-directional antenna that gets you communicating in no time.

Connectivity... Where you want it. Because WaveLAN is wireless, you have your networks where you need them, not where wiring dictates. Plus, since WaveLAN uses cost-effective radio frequency spread-spectrum technology, you can communicate without expensive cabling and wiring.

Connectivity... When you want it. WaveLAN allows a single server to communicate with more than 200 clients over a 50,000 square foot range. And, because of our PCMCIA card for notebooks, you can come into the office and get connected to your LAN when you want... effortlessly.

Connectivity... How you want it.

Whether you use Novell Netware (through 3.11), OS/2 LAN Manager or TCP/IP, WaveLAN is ready to co-exist and keep you connected. Security is just as easy. WaveLAN includes a built-in scrambler and secret LAN Segment ID code. An optional DES chip is available to automatically encrypt all data.

Connectivity... You want it. Here's how you get a WaveLAN card **FREE.** Buy any two designated AT&T/NCR PCs with one WaveLAN card, and we'll throw in the second card FREE. **That's a $695 value.** While WaveLAN runs on all NCR PCs, only those designated with this WaveLAN symbol qualify for this offer. Hurry, offer expires 11/30/93.

WaveLAN SPECIAL

Support Without Strings

Industry Leading 3-year On-Site Warranty

For more than a hundred years, NCR has made customer service the keystone of our business. Once again, we lead the industry with our three-year on-site warranty on all desktop PCs, **including parts, labor and monitor.**

3 YR ON-SITE WARRANTY

Our warranty is a real dollars and cents commitment to you. It covers all U.S.-installed equipment. We don't expect our systems to bring you anything other than tremendous satisfaction. But we've staked our reputation and resources on their quality by giving you a true benchmark for comparison.

Superior Support From NCR Service Specialists

When you need help we're here. Service is on-site within 24 hours from one of 5,000 NCR-trained and dedicated Service Specialists.

These specialists know your NCR systems inside and out. They're located in over 700 service centers throughout the U.S. with the parts you need when you need them.

Your complete satisfaction is why we won't farm out our service work to some third party.

There's just too much at stake. Downtime for you. A hard-won reputation for us.

Call anytime, day or night. Many times you don't need someone on-site to solve a problem. That's why we also keep our **toll-free Techline open twenty-four hours a day.** You'll be in touch with some of the best-trained folks in the business.

24 HR PHONE SUPPORT

Ask about our 30-day, no-questions-asked, money-back guarantee.

No strings attached. No fine print, either. Just the kind of support you expect from NCR.

Without A Doubt...

NCR 486SX/25

$1,295

or

$50/month

- ***Intel Pentium OverDrive Ready***
- Intel486SX/25 (upgradable to 50MHz)
- 3 ISA Expansion Slots/3 Drive Bays
- 120MB Hard Drive (expandable to 1GB)
- 4MB RAM at 70ns (expandable to 32MB)
- External Cache Upgradable to 256KB
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video (Cirrus 5426) w/1MB Video RAM
- 14" SVGA VESA Flicker-Free .39mm Monitor

Performance on a Budget!

Great Systems. Great Prices. Great Values.

intel inside

MICROSOFT® WINDOWS™ READY-TO-RUN

NCR 486SX/33

$1,520

or

$1,845 (w/486DX/33)

WinALIN SPECIAL

- ***Intel Pentium OverDrive Ready***
- Intel486SX/33 (upgradable to 66MHz)
- 3 ISA Expansion Slots/3 Drive Bays
- 160MB Hard Drive (expandable to 1GB)
- 4MB RAM at 70ns (expandable to 32MB)
- External Cache Upgradable to 256KB
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video (Cirrus 5426) w/1MB Video RAM
- 14" SVGA VESA Ficker-Free .28mm Monitor

Great For Home Or Office!

NCR 486DX2/50

$2,495

or

$95/month

WinALIN SPECIAL

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/50
- 2 VESA Expansion Slots/4 ISA Expansion Slots
- 5 Drive Bays
- 240MB Hard Drive (expandable to 2GB)
- 8MB RAM at 70ns (expandable to 64MB)
- External Cache Upgradable to 256KB
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Windows TurboCharger Video (Cirrus 5426) w/1MB Video RAM
- 14" SVGA VESA Flicker-Free .28mm Monitor

Outstanding Business Workhorse!

NCR 486DX2/66

$3,900

or

$141/month

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/66
- 2 VESA Expansion Slots/4 ISA Expansion Slots
- 5 Drive Bays
- 340MB Hard Drive (expandable to 2GB)
- 12MB RAM at 70ns (expandable to 64MB)
- 64KB External Cache (upgradable to 256KB)
- 3.5" Floppy Disk Drive
- VESA Local Bus Video
- Diamond Viper Video (Weitek P9000) w/2MB Video RAM
- NEC 15" SVGA VESA Flat Screen .28mm Monitor

Graphics Powerhouse!

NCR 486DX2/66

$3,715

or

$134/month

WinALIN SPECIAL

- ***Intel Pentium OverDrive Ready***
- Intel486DX2/66
- 2 VESA Expansion Slots/4 ISA Expansion Slots
- 5 Drive Bays
- 520MB Hard Drive (expandable to 2GB)
- 16MB RAM at 70ns (expandable to 64MB)
- 256KB External Cache
- 3.5" Floppy Disk Drive
- Upgradable to VESA Local Bus Video
- SVGA Server Video (Cirrus 5422) w/512KB Video RAM
- 14" SVGA VESA Flicker Free Screen .39mm Monitor

Fantastic File Server!

All NCR Desktop Systems include a pre-loaded Productivity Pak:

Options:

- Fax/modems
- Networking cards
- Memory/disk upgrades
- Printers
- A variety of popular applications.

Demand the best. Only with NCR.

- Superior connectivity, flexibility and mobility.
- Great Windows™ systems.
- Next business-day service and technical support.
- Free 3-year on-site warranty – parts, labor and monitor included.

AT&T

NCR An AT&T Company

Call NCR Direct Connect: 1-800-398-6361

NCR products are available through Direct Connect or through your local reseller. Call 1-800-624-7187 for the reseller nearest you.

Stay connected and road-ready.

These Road-Ready Systems are part of our Mobile Networked Computing strategy that combines NCR's innovative portable technology with AT&T's global communications leadership, like our AT&T EasyLink Services, a portable communications network. Our notebooks are smaller, lighter, faster and better-connected than ever before.

Safari 3150

Mono
$2,315
or
$88/month

Color
SOLD OUT
Call now to reserve your system

- Intel486SX/25 (upgradable to 487)
- 170MB Removable Hard Drive (80MB and 120MB available)
- 3.5" Internal Floppy Drive
- 3-4 Hour Battery-life
- 5.5 lb. (6.3 color)
- 9.5" TFT Active Color or Mono Screen
- 4MB RAM (upgradable to 20MB)
- 512KB Video Memory
- 1 PCMCIA slot (Type 2)
- Local Bus Video
- Dual Video Display
- Front-mounting Cableless Trackball
- Enhanced Pre-loaded Software DOS 6.0, Windows 3.1, Bitfax, Tourguide, AT&T Mail, AccessPLUS and on-line Windows documentation
- 3-year Warranty (first year on-site)

WinTel SPECIAL

Road-ready accessories

- AT&T Keep in Touch PCMCIA Modem 14.4 data/9.6 fax cellular ready
- DataRace™ PCMCIA Modem 9.6 data/9.6 fax
- Cellular Interface Cable (Connects AT&T modem to cellular phone)
- PCMCIA 10Base2 Network Interface Card
- PCMCIA 10BaseT Network Interface Card
- PCMCIA Thick Ethernet Network Interface Card
- PCMCIA Thin Ethernet Network Interface Card
- PCMCIA WaveLAN Network Interface Card
- External Battery Charger & Auto Adapter
- Extra batteries, hard drives, additional RAM and other accessories available.

Safari 3180

Mono
$3,275
or
$118/month

Color
SOLD OUT
Call now to reserve your system

- Intel486SL/33
- 180MB Removable Hard Drive (250MB available)
- 3.5" Internal Floppy Drive (can be replaced w/2nd battery)
- 3-6 Hour Battery-life (upgradable to 12)
- 6.1 lb. (6.8 color)
- 9.5" TFT Active Color Removable Screen or 9.4" Mono Screen
- 4MB RAM (expandable to 12MB)
- 1MB Video Memory
- 2 PCMCIA Slots (Type 2) or 1 Slot (Type 3)
- Local Bus Video
- Dual Video Display
- Trackball
- Enhanced Pre-loaded Software
- 3-year Warranty (first year on-site)

WinTel SPECIAL

Order AT&T/NCR. We've Made It Easy.

We accept VISA, MasterCard or American Express credit cards. Also, don't forget to ask about your business financing and leasing options through AT&T Capital Corporation.

Hours: 8 AM - 8 PM, Monday through Friday.

MasterCard VISA American Express

Performance, Price, Service, Support. Things no one should be without.

AT&T | NCR An AT&T Company

Call NCR Direct Connect: 1-800-398-6361

NCR products are available through Direct Connect or through your local reseller. Call 1-800-624-7187 for the reseller nearest you.

NCR is the name and mark of NCR Corporation. AT&T and the AT&T globe design are registered service marks and trademarks of American Telephone and Telegraph Company. The Intel Inside logo, Intel486 and Pentium are trademarks of the Intel Corporation. DOS and Windows are trademarks of Microsoft Corporation. All other trademarks acknowledged. Prices, configuration and availability subject to change without notice. No substitutes may be made for this promotion. Offer applies to U.S. sales only. Prices and money-back guarantee do not include shipping. Shipping charges are calculated according to weight and distance. Appropriate sales tax will be added. NCR Corporation is not responsible for errors in typography or photography. ©1993 NCR Corporation.

Are you running half a business?

If your accounting isn't right, that's exactly what you're doing.

Now there's help. One-Write Plus® accounting software lets every business have the accurate, complete accounting it needs to succeed. And makes it quick and easy.

One-Write Plus is made especially for small business people unfamiliar with accounting. Or computer software. It's based on the "one-write" manual bookkeeping system – the same system used by over 5-million small businesses because it's so easy to understand.

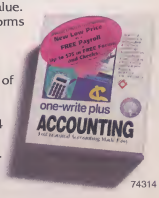
One-Write Plus takes the simplicity of the one-write system and adds the speed and accuracy of your computer. You get complete accounting, including accounts payable, accounts receivable with invoicing, general ledger, inventory tracking, and the full range of financial reports – in a software package that's truly easy to use.

One-Write Plus features a streamlined setup that has you up and writing your first check in about 15 minutes, even if you're a novice. It includes handy on-screen instructions that guide you through every step. And it features easy-to-follow menus and on-line help.

What's more, for a limited time, when you purchase One-Write Plus Accounting and register as a user you'll receive a free copy of One-Write Plus Payroll-a $69.95 value. And up to $75 in free forms and checks.

Now do your accounting every bit as well as you run the rest of your business – with One-Write Plus.

Call 1-800-388-4344 for more information or the reseller nearest you.



one-write plus

74314

formulas and values, press Ctrl with the grave accent key (on most keyboards, ` is the key with the tilde).

REED JACOBSEN
ARLINGTON, WASHINGTON

DBASE IV

COUNT YOUR QUARTERS

Find out which quarter a given day falls in, how far along in the quarter it is, and more with the function Quarter. In a text-only file called QUARTER.PRG or a dBASE IV program, type:

```
FUNCTION Quarter
PARAMETERS pdate,pfiscal,pcode
PRIVATE
  qtr,cdate,xmonth,qdate,xyear,
  nqdate
IF pfiscal < 1 .OR. pfiscal > 12
  .OR. .NOT. pcode $"DdQqRr"
RETURN -1
ENDIF
qtr=1 + INT((12 + MONTH(pdate) -
  pfiscal) / 3)
qtr=IIF(qtr > 4, MOD(qtr,4), qtr)
IF pcode $"Qq"
RETURN qtr
ENDIF
cdate=DTOC(pdate)
xmonth=pfiscal + 3 * (qtr - 1)
xmonth=LTRIM(STR(IIF(xmonth > 12,
  MOD(xmonth,12), xmonth)))
qdate=CTOD(xmonth + "/01/" + SUB-
  STR(cdate,7))
IF qdate > pdate
xyear=LTRIM(STR(YEAR(pdate)-1))
qdate=CTOD(xmonth + "/01/" +
  xyear)
ENDIF
IF pcode $"Dd"
RETURN pdate - qdate + 1
ENDIF
cdate=DTOC(qdate)
xmonth=VAL(LEFT(cdate,2)) + 3
xmonth=LTRIM(STR(IIF(xmonth > 12,
  MOD(xmonth,12), xmonth)))
nqdate=CTOD(xmonth + "/01/" + SUB-
  STR(cdate,7))
IF nqdate < qdate
xyear=LTRIM(STR(YEAR(nqdate)+1))
nqdate=CTOD(xmonth + "/01/" +
  xyear)
ENDIF
RETURN nqdate - 1 - pdate
```

Quarter requires three parameters: the date, the month in which the fiscal year begins, and a parameter

Step by Step: Paradox for Windows

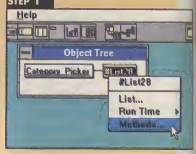
MAKE DROP-DOWN LISTS REFLECT AVAILABLE OPTIONS

Make a drop-down list of possible entries for a field based on the contents of the previous field. For example, if you type COD in the Fish field of our database BIOLIFE.DB, a pick list of cod types appears for the next field.

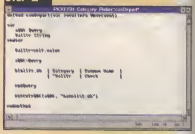
Step 1. Create a method to make the category list.
Before you start coding, create a form with two fields: Category_Picker and Common_Name. For both, define Display Type as Drop-Down Edit. Select the Category_Picker field, and click on Object Tree on the speedbar. In the Object Tree window, right-click on the List box and select Methods. In the New Custom Method box, type OPEN and click on OK. Then type:

```
method open(var eventInfo Event)
var
MyQBE Query
endvar
MyQBE=Query
biolife.db        | Category |
                  | Check    |
endQuery
executeQBE(MyQBE, "catlist.db")
self.DataSource="catlist.Category"
endmethod
```

STEP 1

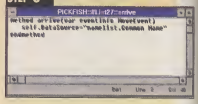


STEP 2



Step 2. Create a method to produce the second field's list.
Select the Category_Picker field again, and press Ctrl-space bar to bring up another Methods window. Select ConDeport, click on OK, and enter code to match that in the second screen at right.

STEP 3



Steps 3 and 3A. Set the Common_Name field's data source.
Select the Common_Name field and click on the Object Tree button on the speedbar. Select the List box in the Object Tree window and press Ctrl-space bar to open its Methods window. Select the Arrive method and enter

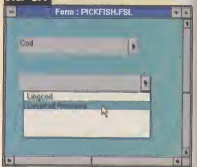
```
method arrive (var eventInfo
  MoveEvent)
self.DataSource="namelist.Common
  Name"
```

before the endmethod line.

The fields are ready to use. In the rest of your form, use the names Category_Picker and Common_Name to return the values picked in each of these fields.

WILLIAM BEEM
ORLANDO, FLORIDA

STEP 3A



Pacific DirectNet. Automatically easier.

WINNER
Longest Emulation Life and number of Pacific DirectNet's for Novell NDPS
Gartner Group, Inc. 1995

	Pacific DirectNet™	HP JetDirect®
Automatic Novell and TCP/IP switching on LaserJet 4	✓	
Support of standard UNIX printing and file protocols for broad cross platform support	✓	
Fast and easy UNIX setup — simply enter IP address	✓	
Novell/UNIX list price	$599	$499
LJ4 PostScript Language Emulation SIMM	included	$499
	$599	$998

Pacific DirectNet was designed to make life on a network easier. It's fast. It's easy to use. And, unlike JetDirect from Hewlett-Packard, it can adapt to whatever network protocol comes its way. Automatically.

The board connects to any Ethernet network, supporting Novell NetWare and UNIX TCP/IP operating systems. With automatic switching, users won't be troubled by having to switch protocols at the printer front panel.

The easiest way to share a LaserJet printer on a network.

Because it supports standard UNIX printing and file transfer protocols, setup in UNIX is a breeze. Pacific DirectNet connects to virtually all UNIX TCP/IP networks including Sun, HP, IBM, DEC, SCO, Solaris, and Interactive UNIX. And it also contains SNMP agents that allow network management software to recognize and manage printers like it does other network devices.

yes NetWare Tested and Approved

Pacific DirectNet offers support for an unlimited number of file servers and queues, as well as for multiple, simultaneous PSERVER and RPRINTER connections on Novell networks. This way users are provided greater flexibility to select any printer on the LAN.

And because we've incorporated Flash memory onto each card, Pacific DirectNet can be updated to add support for new network operating systems or to upgrade features for an existing one.

Pacific DirectNet is compatible with the HP LaserJet® III, IIID, IIISi, 4, 4M, 4Si, 4Si MX, PaintJet® XL300, DeskJet® 1200C, and DesignJet®. It comes with a lifetime warranty, 60-day money back guarantee of satisfaction, and free technical support. And, for a limited time, the Novell and UNIX board comes with PostScript® emulation— all for the standard low price of $599! Or, if you only need NetWare support now, start with our Novell version for only $399 (HP price $499), and upgrade later.

For more information on Pacific DirectNet, a dealer near you, or to order direct from Pacific Data Products, call us at **(619) 625-3661**, FAX (619) 552-0889.

PACIFIC DATA PRODUCTS

PacificDirectNet 9/1/95 Pacific Data Products Inc. 9125 Rehco Rd San Diego CA 92121 In Europe call (+39 0) 67608 Pacific DirectNet is a trademark of Pacific Data Products Inc. HP JetDirect LaserJet PaintJet and DesignJet are registered trademarks of Hewlett-Packard Co. Novell and NetWare are registered trademarks of Novell, Inc. UNIX is a registered trademark of UNIX System Laboratories Inc. PhoenixPage is a registered trademark of Phoenix Technologies Ltd. All other brands and product names are trademarks or registered trademarks of their respective owners. Patent Pend. © 1995 Pacific Data Products Inc.

code for the information you want it to return. Possible parameters for Quarter are *Q* if you want to know which quarter the date is in, *D* to determine how many days have elapsed since the beginning of the quarter, and *R* to find out how many days remain in the quarter. For example, if your fiscal year begins in July (the seventh month) and you want to know which quarter the 15th of November is in, type the following command at a dot prompt:

```
? Quarter({11/15/93},7,"Q")
```

To determine how many days remain in the quarter, type:

```
? Quarter({11/15/93},7,"R")
```

ROGER W. SAUER
FAIRFIELD, CALIFORNIA

ACCESS

DYNAMICALLY COLOR FORM FIELDS

Define a field's color in Access, and it never changes. But what if you want field colors to change based on the data entered? Here's a way to trick Access into coloring a field when the record meets certain criteria.

Let's assume that you have a table containing names, phone numbers, and codes. A *P* in the Code field represents a prospect. You want each of the prospects' phone numbers to appear in green so that you're reminded to call them once a week.

Create a form, include the three fields, and associate the form with the table. In the form's Design view, double-click on the control for the Phone field. Don't select the label associated with the control, if you used one. Select Edit, Copy, then Edit, Paste to display a duplicate of the Phone control on the form.

With the duplicate control selected, click on Properties. Change the Control Name to PhoneToo, and keep Phone as the property of the Control Source box. With the PhoneToo control still selected, click on Palette, Select Green for the control on the Fill line. This color will appear when the Code field contains a *P*.

Position the PhoneToo control so that it exactly overlaps the Phone control on the form. Select View, Grid. Next, select Layout, Snap-to-Grid to display the grid and help position the controls. Close the Design window and answer yes when prompted to save the changes to Form1.

Click on Module in the Database window to switch to Access BASIC. Click on New, and move to the first blank line below any text. Type:

```
Function SetStatus()
If InStr(Forms!Form1!Codes, "P")
  Then
Forms!Form1!PhoneToo.Visible=
  True
Else
Forms!Form1!PhoneToo.Visible=
  False
End If
End Function
```

This makes the PhoneToo control visible only if the Codes field contains a *P*. Close the window, and answer yes when prompted to save the changes to the new module.

Open Form1 again in Design view, and select Edit, Select Form. Click on the Properties button. In the On Current box of the Properties list, type:

```
=SetStatus()
```

Close the Properties dialog box, and close the form to save your changes. Reopen Form1 and scroll through the records. If the Code field contains a *P*, the Phone field will have a green background. Move through the records and watch the field change color.

Since PhoneToo is on top of Phone, the background color of the phone number will appear to change to green when Access displays PhoneToo. The phone number will still be displayed because the Control Source for both Phone and PhoneToo is the field Phone. If the Codes field does not contain a *P*, Access makes PhoneToo invisible, and the original control with its white background color appears.

NOEL NYMAN
SEATTLE, WASHINGTON

VARIABLE-LENGTH FIELDS

When you're creating new fields in Table Design mode, the Field Size property refers to the maximum field length, not the disk space that a field requires. If the data you enter in that field is shorter than the maximum length, Access changes the field size for the record so that there's no wasted space. For a 30-character entry in a 50-character field, for example, Access stores only 30 characters on disk.

Since Access stores only the text entered in a field, use the maximum data size of 255 characters for a field unless you need to specify a certain number of characters (such as 10 characters for an extended zip code). You won't waste disk space, and you'll still be able to enter as much text as necessary. A shortcut: Select a field length of 0, and Access changes the length to 255 the next time you open the table.

WILLIAM BEEM
ORLANDO, FLORIDA

PROPERTY SHEET CUT AND PASTE

Access deactivates the Edit menu's Copy and Paste commands for text in a Property Sheet. However, you can still move functions between boxes with the equivalent Windows keystroke commands for Copy (Ctrl-C) and Paste (Ctrl-V).

WILLIAM BEEM
ORLANDO, FLORIDA

SPEED UP ACCESS

So your databases slow down when they read and write to disk? Adjust MSACCESS.INI to speed up Access. Open MSACCESS.INI (found in your Windows directory) using Windows' Notepad. If you have 4MB of RAM available, go to the [Microsoft Access] section and change the default MaxBufferSize setting from 512 to 4096. If the line doesn't exist, add it by typing MAXBUFFERSIZE=4096. Change the ReadAheadPages line from its default value of 16 to its maximum setting of 31. Save your changes and restart Access.

TECHNICAL SUPPORT GROUP
MICROSOFT ACCESS

Do you know a better, faster, easier, or more effective way to use software? Share it with others, and we'll send you $50 if we publish your secret. Send your tips, along with your name, address, and daytime phone number, to Software Secrets, *PC/Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404.

We probably won't live to tell about it. But hey, our data will.

LOOK FOR FREE MICROSOFT® GAMES PROMOTION WITH VERBATIM PRODUCTS

Verbatim® tapes, optical and floppy disks. Your best defense against data loss.

Circle 144 on reader service card.

THE BENEFITS OF UPG
DOS CAN BE EXPRESSED
FINANCIAL GUY W

You know that 1-2-3® for DOS R3.4 is the fastest DOS spreadsheet ever. And you know its unique 3-D capabilities and SmartIcons™ make it the easiest DOS spreadsheet ever. So it won't be any surprise that 1-2-3 for DOS is also the most productive DOS spreadsheet — upgrading your current spreadsheet to 1-2-3 Release 3.4 will actually save you and your organization time and money. But don't take our word for it.

BUY 1-2-3 RELEASE 3.4 AND REDUCE YOUR COSTS TODAY.

1-2-3 for DOS offers exceptional ease of use plus a GUI that lets you squeeze more out of the DOS environment — without forcing you to upgrade your hardware. This adds up to an incredible return on investment.

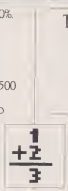
Payback Example:

Savings/user/5 yr.	$2,150
Savings/user/1 yr.	430
Number of users	500
Annual Dollar Savings	$215,000

In fact, independent research from the Gartner Group demonstrates that the productivity enhancements of 1-2-3 for DOS Release 3.4 translate directly into money saved: you can expect gains in individual productivity in excess of 20%. And a return on investment of 330%, in the first year.*

For example, a corporation with 500 users would spend about $59,500 to upgrade to 1-2-3 Release 3.4. Based on a productivity model which considers the cost of training and support, this corporation would save over $200,000 annually in support costs as a result of the upgrade. No matter what size your company is, upgrading to 1-2-3 R3.4 will save you money and increase your productivity.

THE FASTEST, EASIEST DOS SPREADSHEET GIVES YOU THE BEST RETURN ON INVESTMENT.

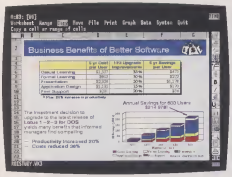


It just makes sense. First, 1-2-3 Release 3.4 has significantly increased the speed of key functions like product load, print, display and recalculation. And R3.4 prints faster, calculates faster, moves blocks of data faster and cuts file retrieve time practically in half. You save time. And time is money.

*Based on an upgrade SRP of $129 Gartner Group 1993 **Qualifying second Lotus spreadsheets are 1-2-3 for DOS or 1-2-3 for Windows® shipping in 1994. Second Lotus spreadsheet must be purchased by 12/31/
Lotus, DataLens and 1-2-3 are registered trademarks and SmartIcons is a tradema

RADING TO 1-2-3 FOR IN TERMS EVEN YOUR LL APPRECIATE.

But we understand it's not enough that it's fast. It's got to be easy: **1-2-3 Release 3.4** offers the most advanced



The productivity and ease-of-use features of 1-2-3 for DOS give you increased productivity and an excellent ROI—without any change in your hardware.

ease-of-use features of any DOS spreadsheet. More than 90 SmartIcons let you access your most commonly used commands with a single click. And because SmartIcons are so easy, users become proficient more quickly, without costly training support — another way upgrading saves you money.

And 1-2-3 Release 3.4 is the only true 3D spreadsheet for DOS — 3D worksheets increase productivity by letting users work much more efficiently with large spreadsheets. Release 3.4 also offers innovative features like DataLens® for external database access, which makes working with outside databases much quicker and much easier. Plus 1-2-3 R3.4 is fully compatible with earlier releases of 1-2-3 across platforms.

SAVE MONEY TOMORROW. 50% OFF YOUR NEXT LOTUS SPREADSHEET UPGRADE.

Purchase your 1-2-3 for DOS — either R2.4 or R3.4 — before December 31, 1993 and get 50% off your next 1-2-3 purchase — 50% off any upgrade to 1-2-3 for DOS or Windows.** This is our way of demonstrating our confidence that Lotus® 1-2-3 is your spreadsheet solution — today and tomorrow.

Just visit your Lotus Authorized Reseller or call **1-800-TRADEUP, ext. 9063** to take advantage of this special offer.*** Or ask for your free demo disk and White Paper, "Business Benefits of Better Software." An incredible return on investment today and a great offer for tomorrow.

Lotus.
Working Together.™

Please have your credit card and product package available when you call. In Canada call **1-800-GO-LOTUS**. *1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus Development Corporation. Windows is a trademark of Microsoft Corporation.

CISC vs. RISC Processors

COMPARE RISC WITH CISC ARCHITECTURE—YOU'LL FIND THAT SIMPLER IS BETTER.

BY RON WHITE • ILLUSTRATION BY TIMOTHY EDWARD DOWNS

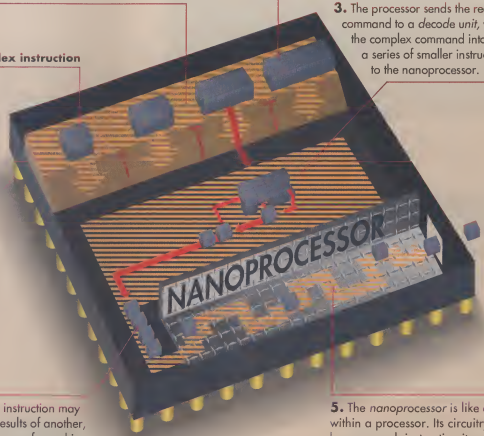
Most PCs use processors that are based on a design philosophy called *complex instruction set computing* (CISC), which uses commands that incorporate many instructions to carry out a single operation. An alternative design, called *reduced instruction set computing* (RISC), is found in newer processors, such as Digital Equipment Corporation's Alpha, IBM's RISC 6000, and, to an extent, Intel's 486 and Pentium. RISC uses several simpler instructions to execute a comparable operation in less time than a single CISC command takes. Here's how the two architectures work.

Complex Instruction Set Computing

1. Built in to a CISC microprocessor is a large set of commands, with several subcommands of varying lengths needed to complete a single operation. These commands are called by either the operating system or a software application when it wants the processor to perform a task.

2. Because CISC commands aren't all the same size, the microprocessor must examine each one to determine the required processing space and the correct treatment of each command. These tasks increase execution time.

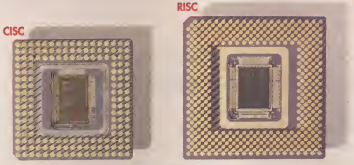
3. The processor sends the requested command to a *decode unit*, which translates the complex command into *microcode*—a series of smaller instructions directed to the nanoprocessor.



4. Because one instruction may depend on the results of another, all instructions are performed in order, one at a time. All pending instructions are put on hold until the current instruction is completed.

5. The *nanoprocessor* is like a processor within a processor. Its circuitry is complex because each instruction it executes may need to pass through several transistors. The instructions thus move relatively slowly through the CISC circuits.

HOW DIFFERENT ARE THEY REALLY?



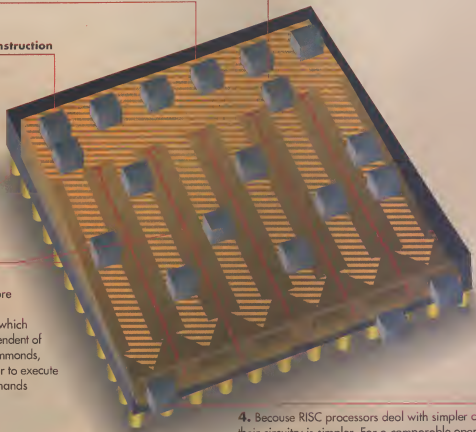
Modern CPUs combine the best of both RISC and CISC architectures. For example, pipelining, a technique that enables CPUs to execute multiple instructions simultaneously, is a RISC design now adopted by CISC.

Reduced Instruction Set Computing

1. Each command in a RISC processor consists of several small, discrete instructions that each perform only a single function. Application software, which must be compiled specially for a RISC processor, tells the processor which combination of its smaller RISC commands to execute to complete an operation.

2. All RISC commands are already microcode of identical size, and there is only one way to load and store them. As a result, RISC commands become ready to execute far more quickly than CISC commands do.

Simple instruction



3. During the compilation of software for a RISC chip, the compiler determines which commands are independent of the results of other commands, allowing the processor to execute as many as ten commands simultaneously.

4. Because RISC processors deal with simpler commands, their circuitry is simpler. For a comparable operation, RISC interprets and executes instructions on average of four to ten times faster than it takes to load and decode a complex CISC command and then execute each of its components.

CRACK YOUR PC RIDDLES WITH HELP FROM PC/C'S ANSWER GUYS. BY DALE LEWALLEN AND JEFF PROSISE

Password Utility for Windows

Can Windows be modified so that it asks for a password at startup and refuses to start if the password is entered incorrectly? This would be a big help in securing my Windows programs and data from unauthorized users.

SANDY RODLEY
MADISON, TENNESSEE

It's easy to limit access to Windows using our PassWord utility, which you can download from PC/Contact's data library 3 (Utilities/Misc.). Look for the filename PASWRD.ZIP. (If you're a ZiffNet or CompuServe subscriber, type GO ZNT:PCCONTACT; if not, see page 421 for information on how to join.) PassWord is a utility for Windows 3.1 that suspends all other system activity until a predefined password is entered. You have two chances to enter the password correctly—if you miss both times, PassWord closes Windows.

PassWord's installation is straightforward—simply add the PASSWORD.EXE file to your Windows directory, then use NotePad to add the line RUN=PASSWORD.EXE to the [Windows] section of your WIN.INI file, which is in your Windows directory. PassWord will now run automatically every time you use Windows.

For best results, make PassWord the first program to load at startup by making it the first program parameter on the RUN line. Make sure no DOS applications are loaded before PassWord, especially those that start with the Allow Close When Active option disabled, because such DOS applications prevent PassWord from terminating Windows.

When you enter your password, the program displays asterisks in place of the characters you type, making it difficult for snoops to see it. PassWord's default password is IDOWINDOWS; it's not case sensitive. To change it, use DOS's DEBUG utility, but be sure to make a backup copy of the program before starting in case something goes wrong.

Next, change the filename extension to .PRG by typing the following line:

```
REN PASSWORD.EXE PASSWORD.PRG
```

Then start DEBUG by typing:

```
DEBUG PASSWORD.PRG
```

To change the password to PC/COMPUTING, say, type this at DEBUG's hyphen prompt:

```
E 1470 "PC/COMPUTING",0
W
Q
```

Your own case-sensitive password can use any keyboard character, with a maximum length of 32 characters. Be sure to enclose the password in quotation marks and type ,0 at the end.

Finally, restore the original program name by typing:

```
REN PASSWORD.PRG PASSWORD.EXE
```

BACKUP and RESTORE Problems

I'm having a problem using DOS's BACKUP and RESTORE commands. If a backup disk contains any sort of error, RESTORE doesn't work. As a result, I can lose whole portions of an entire backup because of a single bad disk early in the sequence. I've tried unsuccessfully to recover data from a bad backup disk by using the Norton Utilities. Because

Help About...

FILE DEFRAGGERS UNDER DOUBLESPACE

IS IT SAFE TO RUN UTILITIES THAT DEFRAGMENT FILES, SUCH AS NORTON UTILITIES' SPEED DISK, ON DRIVES THAT HAVE BEEN COMPRESSED WITH DOS 6.0'S DOUBLESPACE? OR MUST I USE THE DOS DEFRAG COMMAND, WHICH LACKS SOME OF THE FEATURES OF THIRD-PARTY DEFRAGGERS?

BILL GOETZ
GETTYSBURG, PENNSYLVANIA

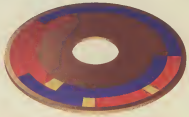
It's safe to use third-party defraggers on DoubleSpaced drives even if those defraggers predate DOS 6.0. The only catch is that older defragging utilities do not optimize DoubleSpaced drives as fully as DEFRAG does.

Here's the issue. Defraggers work by shuffling programs around on the disk so that individual files are stored in contiguous clusters. A *cluster* is the smallest unit of disk space that DOS will allocate—typically four to eight sectors in length. On a normal, uncompressed drive, defragging a file at the cluster level guarantees that the file's data will be stored in contiguous sectors. For esoteric technical reasons, defragging clusters on a DoubleSpaced drive does not necessarily ensure that the sectors are contiguous.

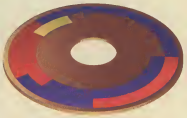
When you run DEFRAG on a DoubleSpaced drive, however, it performs an additional level of optimization that consolidates sectors containing file data into one area of the drive. The bottom line: Defragging a compressed drive with an older defragging utility is not harmful, but it isn't as effective as DEFRAG.

Most vendors' current versions of third-party defragging utilities now fully support DOS 6.0's DoubleSpace and other compression utilities.

Disk Optimization on DoubleSpaced Drives



Disk optimizers that support only DOS 5.0 can leave some file sectors noncontiguous.



Those that support DOS 6.0 thoroughly defragment DoubleSpaced drives.

COMPAQ WOULD LIKE TO
MAKE AN ANNOUNCEMENT OF
STAGGERING PROPORTIONS.

Circle 108 on reader service card.

TRAPPED IN THE BODY OF THIS TINY SE

This is a story about a small computer engineered to be so dependable, you won't think twice about trusting it with your mission-critical applications. And to be this without filling a closet,

much less a room. If you haven't thought of Compaq as an enterprise-critical platform before, we invite you to grab your bifocals and begin. (We'll be cramming a lot of information into this ad, which, given how much we managed to fit into our new servers, only makes sense.)

If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which makes the introduction of the new Compaq ProLiant Server even more timely.

The ProLiant is a new family of affordable, high-performance, easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

Now, how can you be sure our server is truly a

miracle and not a mirage? To begin with, there's Full Spectrum Fault Management, provided by Compaq Insight Manager technology and software that continually monitors over 800 aspects of the server's operating status. (For example, Drive Parameter Tracking checks 15 hard-drive parameters.) All of this information is constantly gathered, analyzed and then used to prevent, tolerate or recover from system problems.

If the performance of a monitored component drops below a specified level, our unique Pre-

Failure Warranty kicks in. We'll actually replace a Compaq warranted drive or memory system free. Before it stops working. No downtime. Ringing cash registers. Happy boss.*

Still, no network's perfect. In the unlikely event problems occur, our server exhibits remarkable tolerance. Every ProLiant includes Compaq-designed hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

ER IS A MAINFRAME WITH AN ATTITUDE.

For example, Automatic Server Recovery 2 uses a historical record of server status and performance to perform an astonishing array of tasks. Like intelligently restarting the server, automatically correcting a variety of problems, and accessing a telephone pager to contact network administrators.

By now you'd expect us to have rethought server setup, configuration and OS installation, but you might be surprised by the results. Introducing SmartStart, a CD-ROM system that takes the headache out of getting your server up and running. ProLiant includes a CD-ROM drive and bundled CDs of optimized Netware and other major operating systems. To get hooked up to your network operating system, simply call your dealer for an access code, enter it, answer a few questions, and leave. Minutes later—say, after you've enjoyed a cup of coffee and a jelly donut—you'll return to find an integrated OS fully installed and optimized for increased performance and improved management. And we'll keep you updated via CD when new operating system versions appear.

*And finally, to accompany our new line of mission-critical servers, we're introducing mission-critical support. With ProLiant, we now offer extensive analysis, installation and service through our CompaqCare System Partners, a select group of highly trained systems experts backed by Compaq engineers. You can now choose 4-hour on-site warranty response upgrade** direct from Compaq. Again, there's our unique Pre-Failure Warranty. And, of course, all Compaq servers come with a 3-year on-site† warranty, and 7-day-a-week, 24-hour-a-day technical support.*

All in a surprisingly small box for not a whole lot of money. In fact, a DX2/66 Compaq ProLiant 1000 starts at about $6000‡.

Which may help to explain the look your boss gives you when he hears how much money you've saved: stunned admiration. But you'll get used to that. It goes with the territory. For more information on the new Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you, just call us at 1-800-345-1518. If you'd like to receive model, feature and specification information immediately via fax, select the Paqfax option. Or, if you'd like that information even sooner, just turn the page.

COMPAQ

Circle 115 on reader service card.

THE NEW COMPAQ PROLIANT MISSION-CRITICAL SERVERS

	ProLiant 1000	ProLiant 2000	ProLiant 4000
HIGH PERFORMANCE NETWORK SERVERS			
Processor	DX2/66 or Pentium 60MHz	DX2/66 or Pentium 66MHz	DX2/66 or Pentium 66MHz
Architecture	TriFlex/PC One Processor	TriFlex with up to two symmetric processors	TriFlex with up to four symmetric processors
Network Interface	Up to 12 High-Speed Channels; NetFlex 2 with Packet Blaster Technology Standard		
Standard Disk Controller	Integrated Fast SCSI-2 and Smart SCSI Array Controller (selected models)		
Storage Capacity	550MB–112GB Internal/external	1050MB–140GB Internal/external	1050MB–140GB Internal/external
Typical Usage	Departmental network services—primarily NetWare	Departmental network application services—NetWare, NT and Unix	Application services for preemptive downsizing—NT and Unix
Transaction Rating	50–150 TPS	200–300 TPS	300–400 TPS
Estimated Starting Street Price‡	$6,000	$8,900	$13,900
SERVER DEPENDABILITY AND AVAILABILITY			
Management	Second-generation Compaq Insight Manager (standard) combines with innovative hardware design to constantly monitor, assess and report server health and performance		
Fault Prevention	Insight Manager alerts you to server status changes in over 800 component parameters, allowing proactive server management backed by 3-Year Pre-Failure Warranty		
Fault Tolerance	Standard support for RAID levels 1, 4, 5; hot-pluggable drives; on-line spare drive; off-line backup processor‡; advanced ECC RAM§		
Fault Recovery	Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure		
SIMPLICITY, EASE OF OWNERSHIP AND SUPPORT			
SmartStart	Standard CD-based intelligent hardware configuration and system software installation, providing simplified server configuration for NetWare, NT or Unix. (CD-ROM drive standard)		
System Warranty	Free Three-Year, On-Site Limited Warranty		
Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds		
4-Hour Warranty Response Upgrade	Optional Three-Year On-Site Warranty upgrade to 4-hour response		
Technical Support	Toll-free, 7 x 24 technical phone support from Compaq engineers		
CompaqCare System Partners	Highly trained, dedicated, third-party professionals who provide systems maintenance and comprehensive technical support		
QuickFind/PaqFax	Proactive notification and delivery of new technical information/7 x 24 fax response for updated specification, configuration and settings data		

COMPAQ

© 1993 Compaq Computer Corporation. All rights reserved. Compaq Registered U.S. Patent and Trademark Office. ProLiant, Insight Manager and SmartStart are trademarks of Compaq Computer Corporation. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. CompaqCare is a servicemark of Compaq Computer Corporation. *Applicable only to advanced ECC memory and disk drives running under Compaq IDA, IDA-2 or SMART SCSI Array controllers. **Fee-based option supported under CompaqCare and not part of the Three-Year On-Site Warranty. †This service provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Computer Support Center. ‡Estimated U.S. reseller selling price, actual reseller pricing will vary. The Intel Inside logo is a registered trademark of the Intel Corporation. §Models 2000 and 4000 only.

Circle 120 on reader service card.

Challenge

I WOULD LIKE TO RUN CERTAIN COMMANDS FROM MY AUTOEXEC.BAT FILE THE FIRST TIME I BOOT MY SYSTEM EACH MORNING BUT NOT IF I REBOOT MY COMPUTER LATER THE SAME DAY. CAN MY SYSTEM DO THIS WITHOUT REQUIRING ANY USER INPUT—PERHAPS BY READING A DATE FILE?

SCOTT RADIG
BISMARCK, NORTH DAKOTA

What you want to do is certainly possible, and it would be useful for running a daily virus scan, a diagnostic program, or other utilities you may want to run once a day. Let's throw the question out to *PC/Computing's* batch file animals: Can you came up with a way to run certain parts of a batch file only once each day, no matter how many times you reboot during the day? Our Challenge winner will be the reader who devises the most easily implemented solution, with extra points awarded to solutions that consist solely of batch files.

If you're up to the Challenge, drop us a letter marked "November Challenge." If we publish your solution, we'll convey our thanks with a check for $50. Please include your name and mailing address.

JULY CHALLENGE SOLVED

In the July issue, we challenged you to come up with ways to make Windows print faster, not only for certain applications like Excel or Word for Windows but for all Windows applications. Lots of readers responded with one or two tips. But Linda Furey of Saint George, Utah, wins with the broadest variety of tips to help you print faster. Here's her list:

- Simplify your documents. If you don't print fancy fonts or intricate graphics, print speed will improve. Many Windows applications offer draft-mode printing, which lets you print unformatted text or worksheets quickly. In Microsoft Excel, this option is called Fast, But Na Graphics and can be found in the Print dialog box. In Word for Windows, look in the Print, Options dialog box for the Draft Output check box. Draft-mode printing limits you to your printer's internal fonts, but it's much faster because your computer doesn't have to generate the fonts itself.
- Use batch printing to send all your documents to the print spooler at once. This is a more efficient method than printing a document, waiting for it, then printing the next one. Open Print Manager and highlight the printer you plan to use (if you have more than one). Then click on the Pause button to pause that printer. Now when you print a document, it will go into the print queue, but it won't be printed immediately. When you leave for lunch, go home for the evening, or just switch to another project, click on the Resume button to release the print jobs and send them to the printer.
- Reset Print Manager so that it has a higher priority than other running Windows applications. Launch Print Manager, and click on the Options menu item. High priority will give more processing time to Print Manager than to other running Windows applications. If you want more processing time for your applications and less for Print Manager, choose low priority.
- Choose a software print spooler, such as Zenographics' $99 Superprint or Software Directions' $149 PrintQ. Both products return control of a Windows app to you faster than Windows' Print Manager. You can order Superprint by contacting Zenographics at (800) 366-7494. **Circle No. 896 on Reader Service Card** You can order PrintQ from Software Directions by calling the company at (800) 346-7638. **Circle No. 897 on Reader Service Card**
- Finally, consider hardware-software solutions such as Microsoft's $199 Windows Printing System. This combination dramatically curtails print times, especially for graphics-intensive documents. You can contact Microsoft by calling (800) 426-9400. **Circle No. 898 on Reader Service Card**

We can't think of any other tips to add to this comprehensive list. Thanks, Linda!

BACKUP fills up the entire disk, there's no room for a recovery program to work. Any suggestions?

DARRYL JORDAN
DAR ES SALAAM, TANZANIA

First, forget about BACKUP and RESTORE—they offer no provision for recovering damaged data. Most commercial backup programs use error-correction codes (ECCs) to recover data from all but the most severely damaged disks. With DOS 6.0, you get this capability free. DOS 6.0's MSBACKUP program features a Use Error Correction option that writes ECC data to the backup disks. In addition, MSBACKUP compresses data so that backups require fewer floppy disks and less time.

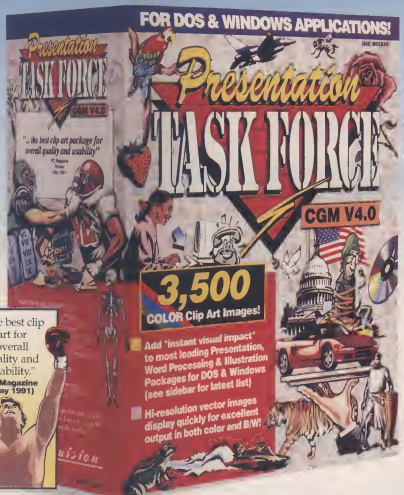
Second, if you must use BACKUP and RESTORE, you don't have to lose an entire backup because of one defective disk. If you have a ten-disk backup set and RESTORE chokes on the third disk, for example, simply remove that disk from the drive and insert the next one. RESTORE warns you that the disk is out of sequence and asks you to either replace the disk or continue. If you press Enter without replacing the disk, RESTORE resumes restoring files with the fourth disk and continues on through the tenth.

Difficulty Pressing Keys

I have a friend who is unable to press multikey combinations such as Ctrl-F10 and Ctrl-Alt-Del because of a physical disability. Is there a software solution to this dilemma, such as a utility that allows keystrokes to be entered sequentially rather than concurrently?

EDWARD J. POTCHEN
DYER, INDIANA

There are several public and shareware keyboard enhancements that let users enter key combinations one key at a time. And AccessDOS, which is included on the MS-DOS 6.0 supplemental utilities disk, also lets you do this. A few years ago, we published one of our own in Q&A called KEYSTICK—you can create it yourself or download the file from PC/Contact as KEYSTK.ZIP in data library 1 (Hot Tips/Secrets).



PRESENTATION TASK FORCE CLIP ART KNOCKS OUT THE COMPETITION!

For quality and value, there are NO contenders!

If you're looking for a comprehensive collection of high quality clip art that can be used with over 60 DOS, Windows and OS/ 2 business applications (see sidebar) ... consider Presentation TASK FORCE 4.0.

PTF 4.0 is the ONLY clip art library to give you **3,500 full-color CGM images** in a MASSIVE, all-in-one collection. At only $199.00, PTF 4.0 is widely recognized as today's best clip art value. Smaller collections, with far fewer images can cost you hundreds (often thousands) of dollars more!

And that's not all! PTF 4.0 includes a **FREE "Color to B&W" Conversion Utility** ($59.00 value) that allows you to optimize PTF color files for dynamite-looking output on b&w printers.

Short on hard disk space? No problem. PTF images are uncompressed, and can be accessed directly from floppy disks. Install the complete collection, or any combination of individual image categories to your hard disk. You decide!

It's unanimous! Presentation Task Force 4.0 delivers a powerful one-two combination of both quality and value, making it the undisputed heavyweight champion of the clip art world.

"Outstanding value & excellent art to boot! ...by far the best value of all the clip art libraries we reviewed."

PC Computing (May 1992)

Available at Software Resellers Everywhere!

Presentation TASK FORCE

WORKS WITH:

OS/2 APPLICATIONS — MICROSOFT WINDOWS APPLICATIONS — DOS APPLICATIONS

- ALDUS FREEHAND
- AMI PROFESSIONAL
- APPLAUSE II
- CHARISMA
- CORELDRAW!
- DESIGNER
- DRAWPERFECT
- EXPRESS PRESENTER
- EXPRESS PUBLISHER
- FREELANCE GRAPHICS
- FREELANCE GRAPHICS FOR WINDOWS
- HARVARD DRAW
- HARVARD GRAPHICS 3.0
- HARVARD GRAPHICS FOR WINDOWS
- HIJAAK
- HIJAAK FOR WINDOWS
- HOLLYWOOD
- LOTUS 1-2-3
- MICROSOFT EXCEL 4.0
- MICROSOFT PUBLISHER
- MICROSOFT WORD FOR WINDOWS
- MULTIMATE
- PAGEMAKER FOR WINDOWS
- PERSUASION FOR WINDOWS
- POWERPOINT FOR WINDOWS
- PRESENTATION EXPRESS
- PRESENTATION TEAM
- PROFESSIONAL WRITE PLUS
- QUATTRO PRO
- SCRAPBOOK+
- VENTURA PUBLISHER FOR WINDOWS
- WINDOWS DRAW
- WORDPERFECT 5.0, 5.1, 6.0
- WORDPERFECT FOR WINDOWS

PLUS DOZENS MORE!

PRESENTATION TASK FORCE IS A REGISTERED TRADEMARK OF NEW VISION TECHNOLOGIES INC. ALL OTHER PRODUCT NAMES ARE THE PROPERTY OF THEIR RESPECTIVE COPYRIGHT OWNERS. ALL PRICES SHOWN IN US DOLLARS (DEALERS MAY SELL FOR LESS). CANADIAN MSL $229.00. CALL FOR INTERNATIONAL PRICING. NEW VISION TECHNOLOGIES INC., 38 AURIGA DRIVE, UNIT 13, NEPEAN, ONTARIO, CANADA K2E 8A5 TEL (613) 727-8164 FAX (613) 727-8180

Circle 26 on reader service card.

Behold.

The Gateway 2000 HandBook® And ColorBook Are Simply Divine!

If you're looking for the perfect portable PC for your next pilgrimage, look no further than the HandBook and ColorBook from Gateway 2000. One of these notebooks is the answer to your prayers.

The HandBook 486 is the next generation of the original HandBook, the product that was the genesis of an entirely new portable PC category dubbed "subnotebook" computers. The new product is blessed with many improvements while retaining all the things people love about the first model. With the HandBook 486, you get the smallest Windows™ PC in this world — and when using a 486DX2 processor, the HandBook is by far the most powerful PC of its size. New HandBook 486 models include SL Enhanced Intel486® CPUs and come with 4MB RAM (expandable to 20MB), 80 or 130MB hard drive, backlit VGA display, built-in pointing device, and one PCMCIA slot. All this and the HandBook 486 still weighs under three pounds, is smaller than the day planners many people carry, and starts at $1,495. Once you get your hands on a HandBook 486, you'll be a HandBook convert.

The ColorBook is the 486 color notebook that's priced the same as other companies' black-and-white models. With the ColorBook, you get bright, crisp color graphics from the dual- scan STN display. You get a small, easy-to-carry notebook. The ColorBook weighs less than 5.7 pounds and measures 11.7" x 8.5" x 1.77". It's one of the thinnest color products on the market. And, you get 486 performance. ColorBook models are based on SL Enhanced Intel486® processors, and include the virtues of a 1.44MB floppy drive, 4MB of RAM (upgradeable to 20MB), a large, fast hard drive, integrated track ball and two PCMCIA Type II card slots. All this starting at under $2,000. Heavenly!

The ColorBook

Dual-Scan STN Display

Dual-scan STN color is the latest technology in portable color displays. The incredible quality of the LCD coupled with local bus video gives you truly out-of-this-world graphics. You can display up to 256 colors with the ColorBook running in VGA mode.

Battery

You can have faith that your rechargeable battery will last up to four hours with power management, over two hours without power management. You also get an AC adapter/charger capable of fast-charging the battery separately or during operation in the ColorBook.

Suspend/Resume

Gateway 2000 HandBook users like suspend/resume so much we designed it into the ColorBook as well!

Drives

The ColorBook includes a floppy drive and a high-capacity hard drive. The hard drive is removable — a handy feature for companies where notebooks are checked out to multiple users. Upgrading to a larger drive in the future is also much easier with the ColorBook's removable hard drive.

External Ports

The ColorBook has parallel, serial, PS/2 and VGA ports. You can use it with an external mouse, keyboard and monitor. The ColorBook supports simultaneous video and allows you to display your ColorBook screen on an external monitor in up to 1024 x 768 resolution.

Your Calling

Surely one of these "good books" is a match made in heaven for your needs. Give us a call. We'll be eternally grateful!

GATEWAY2000

"You've got a friend in the business."®

800-846-2025

slot solution with a SCSI CD-ROM interface that lets you experience the full impact of 24-bit,

TAKING MULTIMEDIA BY STORM.

(This is Sigma.)

The HandBook®

Size

The difference between a 3-pound portable and a 4-pound portable doesn't sound like very much until you lug one around for hours. Then every ounce counts! HandBook users sing the praises of the HandBook's size. It's big enough to be fully functional, but small enough to take anywhere effortlessly.

Battery

A 2.2Ah NiMH rechargeable battery comes with your HandBook. The battery lasts up to four hours with power management, about two hours without power management. You receive an AC adapter/charger that charges the battery pack separately or in the HandBook. The HandBook also has a convenient alkaline battery pack option which enables you to use over-the-counter double-A batteries, too.

Drive

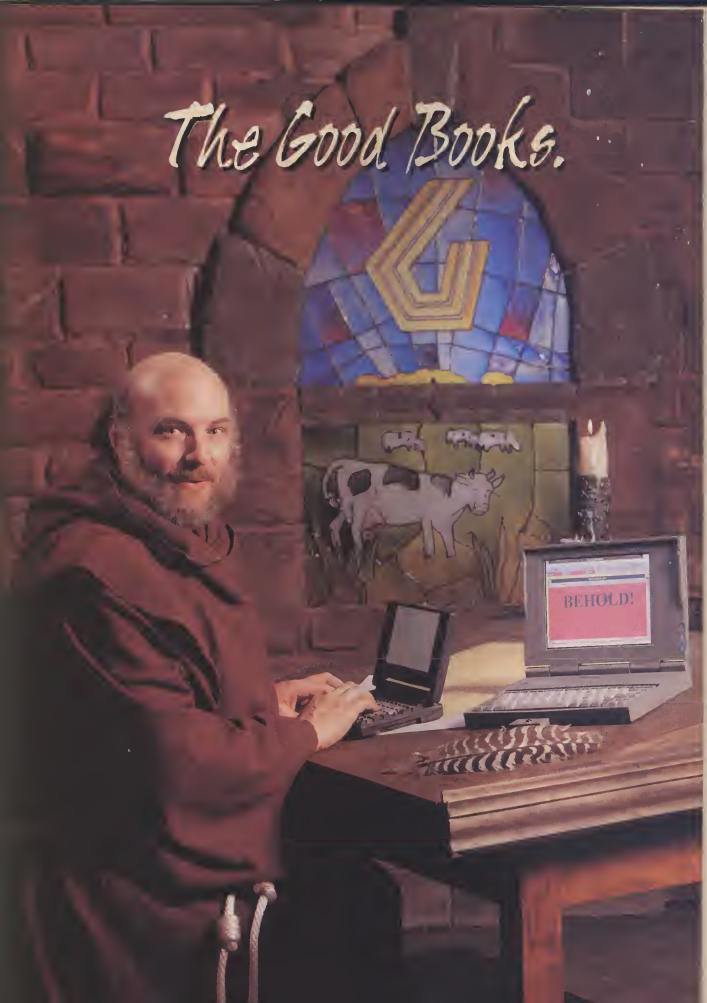
The HandBook 486 includes an 80MB or 130MB hard drive for today's larger Windows programs and files. With the Interlink software utility and serial download cable provided, you can easily transfer data between the HandBook and other PCs.

Display

Looking at the HandBook's VGA display is easy on your eyes. It's the largest backlit display of any subnotebook in this world or the next, and you can use it comfortably in all lighting situations.

Suspend/Resume

Suspend/resume is one of the features HandBook users rejoice about! It allows you to stop work any time, leave all your Windows applications open, then resume instantly at exactly the same chapter and verse without losing anything or restarting the system. It's great for taking notes in meetings!


The Good Books.
BEHOLD!

Good Book Review

COLORBOOK 486SX-25

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 25MHz SL Enhanced Intel® 486SX CPU
- 4MB RAM (expandable to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 80MB IDE Hard Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II (or 1 Type III) Slots
- Integrated Track Ball (2 Buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2® Ports
- External VGA Port
- MS-DOS 6® and Windows™ 3.1

$1995

COLORBOOK 486SX-33

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 33MHz SL Enhanced Intel 486SX CPU
- 4MB RAM (expandable to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 170MB IDE Hard Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II (or 1 Type III) Slots
- Integrated Track Ball (2 Buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Ports
- External VGA Port
- MS-DOS 6 and Windows 3.1

$2395

COLORBOOK 486DX-33

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- 33MHz SL Enhanced Intel 486DX CPU
- 4MB RAM (expandable to 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 170MB IDE Hard Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II (or 1 Type III) Slots
- Integrated Track Ball (2 Buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Ports
- External VGA Port
- MS-DOS 6 and Windows 3.1

$2695

HANDBOOK® 486SX-25

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- 25MHz SL Enhanced Intel 486SX CPU
- 4MB RAM (expandable to 20MB)
- 80MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS 6, Windows 3.1, Interlink and Serial Download Cable

$1495

HANDBOOK 486DX2-40

- Weight: 2.9 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- 40MHz SL Enhanced Intel 486DX2 CPU
- 4MB RAM (expandable to 20MB)
- 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- Integrated Pointing Device
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS 6, Windows 3.1, Interlink and Serial Download Cable

$1995

OPTIONS

PCMCIA Cards.

- TelePath™ fax/modem — 14,400bps send-receive fax, 14,400bps modem. **$319**
- Fax/modem — 9,600bps send-receive fax with 2,400bps modem. **$199**
- Ethernet adapter. **$189**
- Token Ring adapter. **Call**
- HandBook VGA adapter. **$229**

Batteries:

- 2.2Ah NiMH batteries. **$89** each
- HandBook alkaline battery pack. **$29**

Floppy Drive:

- HandBook 3.5" 1.44MB external floppy drive. **$99**

Cases:

- Padded, soft-sided black cases custom-designed for ColorBook or HandBook. ColorBook **$49** HandBook **$55**

Extended VIP Warranty:

- 24-hour turnaround on factory warranty service for one year. Must be purchased at point of sale. Call for details. **$100**

4MB or 16MB RAM Upgrades:

- Due to the volatility of the DRAM market, please call for pricing.

HANDBOOK COMBOS

HandBook Traveler's Packs:

- Case, extra battery, alkaline battery pack & PCMCIA 96/24 fax/modem. **$379**
- Case, extra battery, alkaline battery pack & PCMCIA TelePath fax/modem. **$499**

HandBook Presenter's Pack:

- PCMCIA VGA adapter, Asymetrix® Compel & case. **$319**

COLORBOOK COMBOS

ColorBook Traveler's Packs:

- Case, extra battery & PCMCIA 96/24 fax/modem. **$329**
- Case, extra battery & PCMCIA TelePath fax/modem. **$449**

GATEWAY2000

"You've got a friend in the business."®

intel inside

800-846-2025

610 Gateway Drive • P.O.Box 2000 • N. Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561

Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (Central Time)

©1993 Gateway 2000, Inc. HandBook, AnyKey, CrystalScan, "G" logo and "You've got a friend in the business" slogan are registered trademarks, and Gateway 2000 and TelePath are trademarks of Gateway 2000, Inc. The Intel Inside Logo, Intel486 and Intel are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies.

Prices and configurations are subject to change without notice. Prices do not include shipping.

Q&A

Here's another option: Use a text editor that creates ASCII files and copy the following lines into a file called KEYSTICK.SCR:

```
N KEYSTICK.COM
E 0100 E9 8A 00 00 00 00 00 00
E 0108 00 B8 9D AA B6 38 1D 2A
E 0110 36 FB 50 51 57 06 0E 07
E 0118 BF 09 01 B9 08 00 FC E4
E 0120 60 2E 80 3E 07 01 E0 2E
E 0128 A2 07 01 74 56 F2 AE 75
E 0130 52 80 F9 04 72 10 80 E9
E 0138 04 80 01 D2 E0 F6 D0 2E
E 0140 20 06 08 01 EB 27 B8 40
E 0148 00 8E C0 B0 01 D2 E0 2E
E 0150 84 06 08 01 75 17 2E 08
E 0158 06 08 01 26 30 06 17 00
E 0160 3C 04 72 09 D0 E8 D0 E8
E 0168 26 30 06 18 00 E4 61 8A
E 0170 E0 0C 80 E6 61 8A C4 E6
E 0178 61 FA B0 20 E6 20 07 5F
E 0180 59 58 CF 07 5F 59 58 FA
E 0188 2E FF 2E 03 01 B8 09 35
E 0190 CD 21 89 1E 03 01 8C 06
E 0198 05 01 B8 09 25 BA 11 01
E 01A0 CD 21 BA 80 01 CD 27
RCX
A7
W
Q
```

Then type the command

```
DEBUG < KEYSTICK.SCR
```

to create the utility KEYSTICK.COM, which runs under DOS programs only. To run it, type KEYSTICK at the command prompt or add it to your AUTOEXEC.BAT file. Now you can enter key combinations sequentially rather than simultaneously. Pressing Ctrl, then Alt, then Del, for example, reboots the system just as Ctrl-Alt-Del does. KEYSTICK requires less than 1K of RAM when resident.

But KEYSTICK doesn't work with programs like Windows that mask keystrokes from the keyboard BIOS. For the same functionality under Windows, Microsoft offers the Access Pack for Microsoft Windows. StickyKeys works just like our KEYSTICK program, and the MouseKeys program lets users control the mouse pointer with the arrow keys. Other programs change the keyboard repeat rate and provide audible cues about the status of Caps Lock, Num Lock, and Scroll Lock.

Call Microsoft at (206) 637-7098 to obtain the Access Pack, or download it from CompuServe (type GO CIS: MSL for the Microsoft Software Library; look for the file ACCP.EXE).

Circle No. 899 on Reader Service Card

Packed File Is Corrupt?

I received the message "Packed file is corrupt" when I tried to run a program that had always worked before I upgraded to DOS 6.0. I tried to fix it by running Norton Utilities' Disk Doctor and Speed Disk. Nothing happened. But when I ran the program from Norton Commander and it worked fine.

JOSE GOMEZ-MARQUEZ
TEGUCIGALPA, HONDURAS

Occasionally, "Packed file is corrupt" means that an executable file has been corrupted. More often, it's symptomatic of a bug called EXEPACK, which some developers use to shrink EXE files before they're shipped. The bug shows up only when a packed file is loaded below the 64K mark, which often happens when you move DOS to the high memory area by adding the statement DOS=HIGH to your CONFIG.SYS file. The fact that the program runs fine when launched from Norton Commander is further evidence that EXEPACK is the culprit. Commander itself probably takes up enough RAM that your program gets loaded in memory above the 64K mark.

The fix is easy: Use DOS 5.0's LOADFIX command to start the program. This command loads and runs *program.exe* above the 64K mark, eliminating the error message:

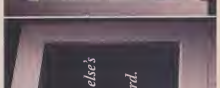
```
LOADFIX program.exe
```

Do you need help using your computer? Q&A provides practical advice on PC problems. Questions are selected on the basis of broadest interest and may be edited for clarity and length. Sorry, but we cannot answer questions individually. Send your question, along with any screen printouts or other details that could help solve it, to Q&A, Help, *PC/Computing*, 950 Tower Lane, 19th Floor, Foster City, CA 94404. You can also reach us via CompuServe, an *PC/Computing*'s PC/Contact online service. Send your comments or questions to 76000,21.

Introducing Sigma's WinStorm. The *Only* Multimedia Card That Actually Is.

Introducing WinStorm, the only display adapter that can transform your PC into an exciting, high-performance, multimedia machine. It's a single-slot solution with a SCSI CD-ROM interface that lets you experience the full impact of 24-bit, photorealistic color and 16-bit, CD-quality sound. Other so-called "multimedia" cards don't even offer video capability. ■ WinStorm also has interfaces for a standard IBM® joystick, full duplex MIDI,* and a 20-voice stereo synthesizer. ■ And it's fully compatible with all popular sound standards, including Sound Blaster, AdLib, Pro AudioSpectrum 16, Thunder Board and MPC. ■ For more information on WinStorm, call: **1-800-845-8086, x251**

SIGMA DESIGNS®
TAKING MULTIMEDIA BY STORM.



© 1993 Sigma Designs, Inc. The Sigma Designs logo is a registered trademark and WinStorm is a trademark of Sigma Designs, Inc. All other brand names and products are trademarks or registered trademarks of their respective holders. Vehicle used by permission of Porsche Cars North America, Inc. PORSCHE® and the shape of the Porsche 911 are trademarks of Dr. Ing. h.c. F. Porsche AG.

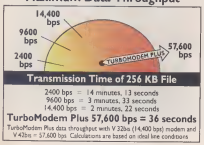
Circle 136 on reader service card.

This Time FASTER is Better!

TurboModem Plus. Slow and steady isn't always the best solution. In today's business world you need the fastest Fax/Modem available to stay ahead of your competition.

Unsurpassed Speed. TurboModem Plus is designed for speed. At over 24 times faster than a 2400 bps modem, the TurboModem Plus transmits at 14,400 bps without data compression. Coupled with V.42bis, data throughput is accelerated up to 57,600 bps. So file transfers and screen refreshes are faster than ever before.

Maximum Data Throughput



Exceptional Performance. TurboModem Plus is fully Hayes-compatible. Be sure of error free transmissions every time with V.42 and MNP 2-4 error correction on the job. TurboModem Plus also includes a 14,400 bps Group III fax modem so you can send and receive faxes at your PC. The TurboModem internal card installs quickly into your PC — or, connect the light-weight external version to your serial port in a snap. So don't be a tortoise — get the speed of a winner.

From the company that continues to bring you high quality products at great prices.

TheComplete PC®
High Quality Communication Solutions

Copyright © 1993, The Complete PC, Inc. The Complete PC and TurboModem Plus are trademarks of The Complete PC, Inc. Other product names or company names mentioned are trademarks or registered trademarks of their respective companies

Circle 139 on reader service card.

PC Contact

This Month's Free Software and Shareware All the public-domain and shareware programs, batch files, and utilities featured in *PC/Computing* each month are available on our online service, PC/Contact, or on disk from Public Brand Software for a fee. Shareware requires additional payment to authors for continued use. Here's a sampling of the programs you'll find this month.

Let's Change Directories ..... **DOS, page 370**
Stop trying to switch directories at the command line: Get LCD, a simple, easy-to-use utility that makes switching directories a breeze. It makes life at the command prompt a whole lot easier. Download LCD.EXE from data library 3 (Utilities/Misc.).

MakeTree ..... **DOS, page 371**
Don't waste time typing MKDir commands one after another when you need to create a long chain of nested subdirectories in DOS. MakeTree gets the job done fast, creating multiple subdirectories, such as \NOVEMBER\BUDGET\RESEARCH, in a single pass. Download MKTREE.ZIP from data library 1 (Utilities/Misc.).

VB System Information ..... **Windows, page 378**
Get the skinny on your system: VB System Information gives you the lowdown on the CPU, the BIOS manufacturer and date, the DOS version, the bus type, the amount of installed RAM, and information about the mouse driver. It's a one-stop source of detailed information about your computer. Download VBSYS.ZIP from data library 3 (Hot Tips/Secrets). *Note:* This program requires the Visual Basic runtime module available from PC/Contact. Download VBRUNZ.ZIP from data library 1 (Utilities/Misc.).

PassWord ..... **Q&A, page 406**
Worried about snoops and spies trying to get sensitive information off your system? With PassWord, you can prevent anyone from starting Windows until they type the correct password. You can also use it to lock your system when you need to step away for a few minutes. Download PASWRD.ZIP from data library 3 (Utilities/Misc.).

HOW TO JOIN PC/CONTACT

For current CompuServe subscribers, just type GO PCCONTACT to access the forum. Cost is based on CIS's fee of $12.80 per hour for 1,200/2,400 bps and $22.80 per hour for 9,600 bps. There is an additional $2.50 ZiffNet membership charge per month for all users, which includes a number of services. For complete information, type GO ZNT:RATES when online.

For new subscribers, follow these steps:

1. Set the following parameters within your communications program: 7 data bits, even parity, 1 stop bit, and full duplex.
2. Call CompuServe's toll-free customer assistance line at (800) 848-8990 (United States) or (800) 635-6225 (Canada); this call is quick and free. From other countries, dial CompuServe direct at (614) 457-8650. A voice-response system will ask you if you want a local-access number. Then you'll be asked to enter your phone number and the speed at which you want to access the system. CompuServe reads back the local number you'll use to access the service.
   Or call CompuServe with your modem. Set up your modem and telecommunications package using 7 data bits, even parity, 1 stop bit, and full duplex, and call (800) 346-3247. When the modem connects, press Enter. When you see the HOST NAME prompt, type in PHONES and then hit Enter. Then just follow the onscreen menus and note the access phone number for your area.
3. Dial the local-access number with a modem. When you connect to the network, press Ctrl-C to get its attention.
4. At the HOST NAME prompt, type CIS (which is the acronym of the CompuServe Information Service).
5. At the USER ID prompt, enter 177000,5300.
6. At the PASSWORD prompt, enter PC/CONTACT.
7. At the ENTER AGREEMENT NUMBER? prompt, type 210PCC1.
8. If you have trouble, call the customer assistance line at (800) 848-8990. After you follow the above procedures, the CIS system will provide you with your own user ID—called a PPN—and a temporary password. You can then log on and begin to explore PC/Contact. In about two weeks, you'll receive a letter from CIS confirming your PPN and providing you with a new password. You should then change your password by typing GO PASSWORD at any CIS prompt.

TOP PICKS ON DISK

You can easily get all the public-domain utilities or shareware covered in this month's issue by calling the disk vendor Public Brand Software at (800) 426-3475 or (317) 856-7571. Ask for this month's Editors' Picks from *PC/Computing*. They're available for $5 or less per disk (most disks have several utilities and programs on them), plus $5 for shipping and handling. Visa and MasterCard are accepted.

For just $299, Sigma's WinMovie is your *only* ticket to grabbing Movies.

Sigma Designs presents the only desktop digital video board that lets you capture movies and imaginations for under $300. Introducing WinMovie,™ magnet of a deal in multimedia solutions for Windows.™

WinMovie provides real-time video capture and playback with realistic, continuous movement ideal for presentations, training and entertainment. It even comes bundled with Microsoft® Video for Windows, a $200 value, so you can start the action as soon as you get your hands on it. So call for WinMovie today. It's a scream!

Sigma Designs, Inc., 47900 Bayside Parkway, Fremont, CA 94538, U.S.A. Phone: 510-770-0100 Fax: 510-770-2640 1-800-845-8086, x 282

Best Video Capture, Best Price, Only $299.

SIGMA DESIGNS™ OPENING WINDOWS TO MULTIMEDIA

©1993 Sigma Designs, Inc. The Sigma Designs logo is a registered trademark and Windows is a trademark of Sigma Designs, Inc. "The Contrast Drop The Black Lagoon" & ©1994 & TM Universal City Studios Inc. All rights reserved. Licensed by MCA/Universal Merchandising, Inc. All other brand names and products are trademarks or registered trademarks of their respective holders.

Circle 179 on reader service card.

Stop WordPerfect 5.2 Network Print Problems

USE THESE TIPS TO PERFECT NETWORK PRINTING UNDER WORDPERFECT FOR WINDOWS. **BY JOHN TASCHEK**

WORDPERFECT 5.2 FOR Windows is one of the friendliest network applications around. Yet despite the company's well-deserved reputation for excellent DOS printer drivers, its Windows word processor stumbles when it comes to sharing them on a network.

Instead of providing quick and easy printing, WordPerfect 5.2 may litter your screens with error messages when you change print settings. Even if you've escaped error messages so far, chances are you've frequently stood idle while WordPerfect "updated" its printer driver—something that can happen even when you follow WordPerfect's installation instructions to the letter.

The good news: WordPerfect says that Version 6.0 of its Windows word processor solves these network problems. The bad news: While you're still using Version 5.2, you practically need a degree in printer drivers.

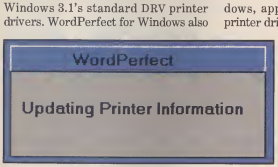
What's the Problem?

WordPerfect 5.2 uses two sets of printer drivers to maintain compatibility between its DOS and Windows word processors. WordPerfect's PRS printer drivers, which originated in the DOS version, offer rich support for more than 900 printers. The company's Windows word processor adds WRS printer drivers, which include support for TrueType fonts under Windows. WRS drivers extract font information from Windows 3.1's standard DRV printer drivers. WordPerfect for Windows also installs a WP{WP}.TF file that gives WordPerfect's internal page formatter more font information than is normally available from the PRS files.

The problem with network printing in WordPerfect 5.2 for Windows stems from a limitation in the way the program implements Windows printer drivers on a LAN. When you set up WordPerfect on a network, the installation routine asks you to specify a path for its printer drivers. Ordinarily, most network administrators choose a shared directory to minimize disk space usage and maintain global control over the drivers. To prevent the file from being accidentally changed or overwritten, the administrator usually restricts access to the directory by giving users just read and file-scan rights.

This strategy works well if you use only PRS files, an option you select by choosing the WordPerfect check box in the Select Printer dialog box under the File menu. When users try to alter the PRS drivers by attempting to add a new paper size or selecting a different font set, WordPerfect returns the message "Access denied." Users are unlikely to want to make many changes to PRS files, however, because the few changes they might need to make can easily be handled by a network administrator.

Even so, there are some shortcomings to using WordPerfect's PRS drivers in a network installation. Under Windows, applications share a common printer driver, so when you make printer setup changes, every application is affected. With PRS printer drivers, on the other hand, you can no longer extend printer setup changes automatically from Windows to WordPerfect, or vice versa. You also lose access to Windows 3.1's TrueType fonts with PRS drivers.



Networked WordPerfect 5.2 for Windows users are familiar with this message, which can interrupt activity for a full minute.

The use of WordPerfect's WRS files (which you select by choosing Windows in the File menu's Select Printer dialog box) presents another problem: A new WRS file is created each time its information doesn't match that in the corresponding Windows DRV driver. For example, WRS files are recompiled every time a new font is added to Windows. As a result, they become a serious printer problem on a network where a single instance of a driver is shared by multiple users. This problem is manifested in one of two ways, depending on how the network administrator has set access to WordPerfect's printer drivers.

Write Access Pros and Cons

Networked WRS files force network administrators to choose between two evils: offering easy access to shared drivers or subjecting users to a deluge of error messages. To let users share drivers, administrators must place the files in a common directory. In a default installation, WRS drivers and PRS drivers must be kept in the same directory, to which most administrators would restrict access. If administrators hold fast to conventional restrictions, WordPerfect returns the "Access denied" error messages. This means that WordPerfect sends ambiguous error messages when users attempt to write to WRS files.

To work around those problems, many administrators ease restrictions to the shared printer-driver directory. But this leaves the PRS files open to unrestricted modification and creates the infamous

Netapp of the Month

Disk Spool II

Prapel print jobs inta warp drive with Budget Software's Disk Spaal II, a print-spaaling utility that warks with virtually all Windaws and DOS applicatians and can run acrass a network ar an its awn. A pap-up menu lets you instantly start, stap, and manitor all print jobs. Downlaad DSKSPL.ZIP from PC/Contact's data library 3 (Utilities/Misc.), ar arder it for $44 from Budget Saftwore, P.O. Box 621534, Littletan, CO 80162; (303) 932-1705.

Reader Service No. 900 PC/Contact

"...when our PC/Computing ad first hit, calls jumped 40%!"

"One thing that makes us unique is that we do our own R & D and manufacture everything in the PC, down to the chip sets and keyboards. Although Expotech was started only last July, we're already the fifth largest systems direct marketer in the U.S.

"We ship 5,000 PCs a month — and growing. I say, 'and growing', because when our PC/Computing ad first hit, calls jumped 40%! I had to add extra sales people. In fact, PC/Computing gave us the greatest single issue response of any book we've ever been in.

"Plus, we found that a lot of our business from PC/Computing is purchase order business and that denotes larger corporations. With PC/Computing we're doing twice as much purchase order business as the other books. So it's not just the call volume, but also the quality of the readers that quickly made PC/Computing a primary book for us. And we've gone from four pages in the first issue right to seven pages in the next one."

expotech
A VTECH COMPANY

800 N. Church St.
Lake Zurich, IL 60047
(800) 284-3976
Fax: (800) 947-3976

BILL BADGER
Director of Direct Marketing

Call 1-800-676-4PCC

850,000 Business Solutions Buyers are looking to buy your products.

PC Computing

It's got a built-in local-bus graphic
accelerator that can handle 21.1
megapixels per second and hit
better than 30 Winmarks. The har
drive scored 175 on the core test
it has an average access time o
14ms and a data transfer rate o
31.7 megabytes per second. The CPU
runs at 33MHz, which is 2.7 MIPS,
or an SI rating of 72.4. It scored 87
PowerMarks, 118 SysMarks, 17
Whetstones, and 700 Dhrystones.

Yeah, but will it get the job done?

Introducing The New Standard Of Computer Product Performance: USABILITY

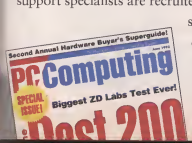
It's Time for Product Testing to Focus on the Way People Really Work. The true test of hardware and software isn't the number of features or its rating in nanoseconds. It's how many hours it saves you at the end of the week.

For all those who understand that principle, *PC/ Computing* introduces a new performance standard: The *PC/Computing* Usability Seal of Approval.

Usability testing uses human behavior to measure a product's performance in the real business world. It's what defines the real differences between products these days.

PC/Computing has designed a system for clear, concise evaluations of products based on their usability. The *PC/Computing* Usability Seal of Approval will be awarded only to products that meet those exacting standards.

Scientific Testing in Real World Conditions. For each product category, the Usability Lab directors develop a comprehensive test script. Testers are chosen from the business world and carefully screened to match the product's typical user profile. For example, CAD software is matched with experienced CAD users; system support specialists are recruited to test operating systems. Videotaping captures their reactions and, in addition to interviews and questionnaires, is used for analysis and evaluation of the products.



The results provide assurance that a product delivers on its promise of productivity. That when you buy a new piece of hardware or software you can expect to solve business problems, not get more headaches.

PC/Computing: Blazing the Trail. From its beginning, *PC/Computing* has been serving the needs of readers who buy PCs to boost the business productivity of their companies. Its no-nonsense evaluations of products on real-world dimensions has made it the preferred information source that now delivers 850,000 monthly readers... an audience of buyers that continues to grow at record-setting rates.

Usability. It's the measure which will establish the next generation of computer products. And *PC/ Computing* leads the pack in setting the standard.

PC Computing
USABILITY
APPROVED

The Test of the Best in Business.

© Ziff Communications Company

"Updating printer information" message.

Why is this such a big problem? Each time a font change is made to a Windows driver, WordPerfect must recompile the WRS file, and the "Updating printer information" message appears on the screens of everyone using WordPerfect for Windows on the network. It can take as long as a minute for the driver to be updated—and this could occur several times a day. You can't interrupt the update, and you can't avoid it by task switching. At some companies, the experience could be enough to cause an armed insurrection.

The User Fix

As a user on a network, you can't do much to solve WordPerfect 5.2 for Windows' network printing problems. But if your network administrator can't or won't solve the problem, try this fix.

Start by using File Manager to create a directory called Printers on your local drive. Then, from WordPerfect, select File, Preferences, Location of Files, and note the path of Printer Files (this is the fourth option in the dialog box). Next, use File Manager in order to locate that path on the network and find all drivers with the file extensions .ALL, .PRS, and .WRS. There may be several of each of these types listed. Copy the ones with the extensions that are most closely associated with your printer. If you have a Hewlett-Packard LaserJet III, for example, look for the files WPHP1.ALL, HPLASIII.PRS, and HPLASIII.WRS, and copy them to the new Printers directory on your hard drive.

Next, from WordPerfect, choose File, Preferences, Location of Files, and tab to the Printers field. Delete the pathname listed in the dialog box and replace it with the pathname of your Printers directory. Select File, Printer, and make sure that you've selected the Windows check box in the Printer Drivers dialog box. Click on Update so that WordPerfect will register any new information, then click on OK to close the box.

From now on, you have complete local control over both your WordPerfect drivers and your WordPerfect Windows printer files. You can change any printer setting you want—for instance, to specify a new paper size or to add your own fonts—without getting an "Access denied" error message. You may continue to receive "Updating printer information" messages, but only when you add or remove fonts—not whenever someone else on the network makes changes. And your updates won't be inflicted on other network users.

There's a downside to this method, however: WordPerfect 5.2's printer drivers need at least 200K on your hard drive. And you won't receive driver updates automatically, as you would if you shared the driver on the network.

The Administrator Fix

The administrator fix is basically a networkwide version of the user fix. There's an undocumented workaround available in WordPerfect 5.2 for Windows releases dated April 1993 or later. Acquire a new release if the version you're running is older than that.

The workaround involves adding a setting to the WPC_NET.INI file that lets you store PRS printer files in a shared directory while you redirect WordPerfect's pointer for them to local drives or private network directories. WordPerfect creates WRS files automatically. By changing the location of the drivers to users' hard disks, you prompt WordPerfect to create a new WRS file for each user.

Separating WRS files from PRS files makes sense because WordPerfect's network problems stem from shared WRS printer drivers. You don't have to redirect PRS files: They work fine in a shared directory, and because they aren't generated automatically, you'd have to copy them manually to each and every user's local directory.

To move the WRS drivers, use an ASCII text editor such as Windows' Notepad to open WPC_NET.INI in WordPerfect's WPCINI directory on the network, and add these lines:

```
[WIN2WRS]
WRSPath=C:\pathname
```

The pathname following the WRSPath statement must be common to every user's local drive for this to work. C:\Windows is a good bet, but you need to check with your users. If you can't find a common path and directory, you must create one for each user's local drive or personal network directory.

Once you've done this, the program reads the information in WPC_NET.INI whenever users start WordPerfect for Windows. If there is a WRSPath statement, WordPerfect looks for a WRS file. If it doesn't find one, it creates a new one, generating the "Updating printer information" message. However, these messages are much less frequent.

Few Alternatives

There's no perfect method for sharing WordPerfect 5.2 for Windows printer drivers. If you loosen the restrictions, you lose control over global updates and invite the "Updating printer information" fiasco. If you place heavy restrictions on driver access, you'll experience ominous error messages and users will be frustrated in their attempts to make needed changes that are written to the driver. The solutions I offer are temporary workarounds that can get you through for the time being. Thankfully, WordPerfect has heeded the calls for help. I haven't tested it yet, but the best fix to this problem will probably be to install WordPerfect 6.0 for Windows.

Contact John Taschek with questions or suggestions concerning Networking Smarter by writing to Help, PC/Computing, 950 Tower Lane, 19th Floor, Foster City, CA 94404, or via CompuServe at 72241,1451.

The LAN Printing Woes of WordPerfect

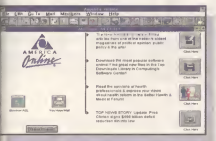
Using WordPerfect's WRS drivers:

- Frequent "Updating printer information" messages.
- Patchy compatibility.
- Slower printing.
- Inability to maintain WRS files globally if they're not shared.

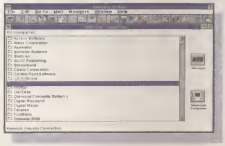
Using WordPerfect's PRS drivers:

- No TrueType font support.
- Inability to record printer changes made from Windows.

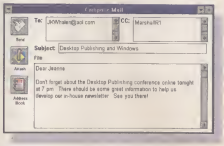
The More Windows You Open, The Cooler It Gets.℠



PC *and* Microsoft Windows Versions



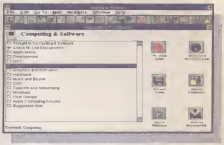
Expert Computing Advice



Internet E-Mail Gateway

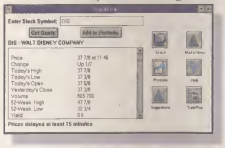
Windows Advice & Support

Fast, Easy Downloading



More Than 30,000 Software Files

Searchable News



Stock Quotes & Portfolio Management

Encyclopedia & Homework Help

RESPOND BY 11/30/93

Free Trial Offer. See Other Side For Details.

Yes! I'd Like To Try America Online — Free.

Send me the free software and trial membership. I understand there's no risk — if I'm not completely satisfied, I may cancel without further obligation.

AMERICA Online®

NAME

ADDRESS

CITY

STATE ZIP

( )
HOME PHONE

Disk Type and Size:

❑ 5.25 ❑ 3.5

❑ HIGH DENSITY ❑ DOUBLE DENSITY

Do you use Windows 3.1? ❑ Yes ❑ No

America Online is a registered service mark of America Online, Inc. Use of America Online requires a major credit card or checking account

7877/W

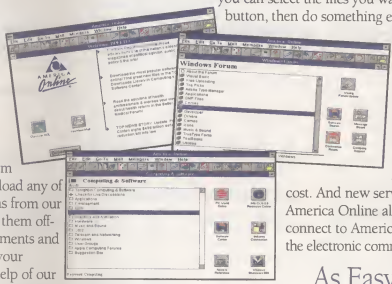
AVAILABLE FOR DOS AND MICROSOFT WINDOWS

Try America Online—Free.

There's only one way to get the big picture about America Online. Try it. That's why we make it so easy. We give you the software and let you try it, absolutely free. You'll be impressed by everything you can do with your computer, a modem, and America Online, and how easily you can do it.

Just Point and Click.

Get advice from hardware and software developers, experts and reviewers — even ask them questions directly. Download any of the thousands of programs from our software libraries and use them off-line. Monitor your investments and the latest news. Manage your business better with the help of our Microsoft® Small Business Center. Save time and money in hundreds of different ways, from browsing for gifts in our online shopping area or booking your own airline tickets to using our great computing support forums.



New Windows to Open All The Time.

America Online offers multi-file downloading, so you can select the files you want with the click of a button, then do something else while they're downloaded for you. When the downloading is finished, you'll automatically be signed off the service. Our e-mail gateway to the Internet links you to members of other e-mail and online systems for no additional cost. And new services are being added to America Online all the time. When you connect to America Online, you connect to the electronic community of the future – today.

As Easy to Try As It Is to Use.

If you've never tried America Online, now's the time. If you have in the past, try us again — America Online is available for DOS and now, the new Windows version for Microsoft Windows 3.1 users – with multi-tasking, flashbar navigation, and much more. But don't take our word for it. Give us a try and find out what you can accomplish when you open a few of our windows.

Complete and mail the card or call 1-800-827-6364, Ext. 7877, today!

AMERICA Online

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 9096 VIENNA, VA

POSTAGE WILL BE PAID BY ADDRESSEE

AMERICA Online

8619 Westwood Center Drive
Vienna, VA 22182-9806

Incorporating PC Sources

Direct to You

Inside Spec Watch

Forget slow CD-ROM drives, underpowered subnotebooks, and fax without OCR. Demand the best—and a better warranty.

CD-ROM is hot. System makers are frantically trying to ship a CD-ROM drive with every PC they deliver next year. But quality CD-ROM drives are not in high supply, and the drive that comes with your system might be a dog. Bark back: Ask your dealer to swap it for a better one. This month we show you how to size up CD-ROM drives to find one that delivers performance well into the future. Other trends to watch:

- **486 Subnotebooks**
  In case you haven't heard, the 386 is dead. Even the 4-pounders from Hewlett-Packard, Gateway, and Zeos use the 486. So don't get conned into buying a 386-based system for anything. R.I.P.

- **Memory-Hungry Operating Systems**
  While you're at it, bump up the 4MB of RAM that come with most subnotebooks to 8MB. Windows NT apps will be trickling to market next year. OS/2 applications are already arriving. Who says you can't run 32-bit applications on a 4-pound machine?

- **Fax with OCR**
  Most high-speed fax modems come bundled with Windows fax software. Better packages include OCR capability. If yours doesn't, ask your dealer to swap out the bundled package for one with OCR—even if it costs a little more.

- **Three-Year Warranties**
  The newest front in the PC price wars is warranty and service. Fading fast is the industry-standard one-year warranty. Better system makers are beginning to offer three-year warranties.

By Marty Jerome

Direct to You • Advertiser Index

VENDOR NAME	PAGE NO.	HOURS OPEN	800 NUMBER
SYSTEMS			
ABERDEEN	501	M-F 7:30 - 6	800-552-6868
ARES	468-469	24 HOURS	800-322-3200
COMPUTER CLIPBOARD	438	M-F 9-6	800-777-4932
COMPUTER DISCOUNT WAREHOUSE	489-491	M-F 7:30-7:30; SAT 9-5 (CDT)	800-473-4CDW
COMTRADE	504-505	M-S 7-7	800-969-2123
CORNELL COMPUTER	474-475	M-F 7:7; S 9-4	800-886-8999
DEE ONE SYSTEMS	515	M-F 8-6; SAT 10-4 (PST)	800-831-8808
EXPOTECH	461-467	M-F 7:8:30; SAT 9-6; SUN 10-3 (EST)	800-465-2737
HI-TECH USA	516-517	M-F 8-6; SAT 10-4 (PST)	800-831-2888
INSIGHT	496	24 HOURS	800-927-9921
MIDWEST MICRO	451-455	M-F 9-7; SAT 10-4	800-682-7248
QUANTEX MICROSYSTEMS	476-477	M-F 9:9; SAT 9-9	800-288-1366
USA FLEX	486-487	M-F 24 HOURS; SAT-SUN 9-4	800-723-0334
PERIPHERALS			
ABERDEEN	501	M-F 7:30-6	800-552-6868
AMDEK	503	M-F 7-7	800-72-AMDEK
ARLINGTON COMPUTER PRODUCTS	484-485	M-F 7:30-7:30; SAT 9-5 (CST)	800-548-5105
ARNET	502	M-F 8-7	800-800-9829
COMPUTABILITY	442-445	M-F 8-8; SAT 9-5 (CST)	800-554-2184
DEE ONE SYSTEMS	515	M-F 8-6; SAT 10-4 (PST)	800-831-8808
DUSTIN DISCOUNT SOFTWARE	456-459	M-F 6-5; SAT 10-12	800-274-6611
ELECTRIFIED DISCOUNTERS	473	M-TH 9-7; F-S 10-6	800-678-8585
ENVISIONS	509-512	M-F 6-5; SAT 9-1 (PST)	800-936-7226
FIRST SOURCE	480	M-F 8-5; S 9-3	800-429-9866
HI-TECH USA	516-517	M-F 8-6; SAT 10- (PST)	800-831-2888
INSIGHT	496	24 HOURS	800-927-9921
JDR MICRODEVICES	498	24 HOURS	800-538-5000
MEGAHALUS	492-495	M 8-8; TU-F 8-7; SAT 9-3(CST)	800-786-1185
MIDWEST MICRO	451-455	M-F 9-7; SAT 10-4	800-682-7248
TC COMPUTERS	506-507	M-F 8-8; SAT 10-4	800-685-2137
TIGERDIRECT	432-433	M-F 8:30-12; SAT 8:30-8; SUN 11-5	800-888-4437
USA FLEX	486-487	M-F 24 HOURS; SAT-SUN 9-4	800-723-0334
PRINTERS			
ARLINGTON COMPUTER PRODUCTS	484-485	M-F 7:30-7:30; SAT 9-5 (CST)	800-548-5105
BUFFALO PRODUCTS	488	M-F 7-5 (PST)	800-345-2356
COMPUTABILITY	442-445	M-F 8-8; SAT 9-5 (CST)	800-554-2184
COMPUTER CLIPBOARD	438	M-F 9-6	800-777-4932
DEE ONE SYSTEMS	515	M-F 8-6; SAT 10-4 (PST)	800-831-8808
ELECTRIFIED DISCOUNTERS	473	M-TH 9-7; F-S 10-6	800-678-8585
HI-TECH USA	516-517	M-F 8-6; SAT 10-4 (PST)	800-831-2888
LOGICAL CONNECTION	488	M-F 8-4:30 (PST)	800-238-9415
TEXAS INSTRUMENTS	450		800-527-3500
USA FLEX	486-487	M-F 24 HOURS; SAT-SUN 9-4	800-723-0334
SOFTWARE			
ABACUS	439	M-F 24 HOURS	800-451-4319
COMPUTABILITY	442-445	M-F 8-8; SAT 9-5 (CST)	800-554-2184
COMPUTER DISCOUNT WAREHOUSE	489-491	M-F 7:30-7:30; SAT 9-5 (CDT)	800-473-4CDW
CORSEL	472	M-F 9-6	800-772-6235
DISK-COUNT SOFTWARE	518	M-F 9-8; SAT 10-3	800-448-6658
DUSTIN	456-459	M-F 6-5; SAT 10-12	800-274-6611
ELECTRIFIED DISCOUNTERS	473	M-F 9-7; F-S10-6	800-678-8585
HI-TECH USA	516-517	M-F 8-6; SAT 10-4 (PST)	800-831-2888
LANDMARK	497	M-T 8-9; F 8-6; SAT 10-3	800-683-6696
MICROBIZ	478	M-F 8:30-6	800-496-6789
PC ZONE	499-500	24 HOURS	800-257-0386
SURPLUS SOFTWARE	508	M-F 1-5 (PST)	800-753-7877
TIGERDIRECT	432-433	M-F 8:30-12; SAT 8:30-8; SUN 11-5	800-888-4437
USA FLEX	486-487	M-F 24 HOURS; SAT-SUN 9-4	800-723-0334
MEMORY			
FIRST SOURCE	480	M-F 8-5; SAT 9-3	800-429-9866
JDR MICRODEVICES	498	24 HOURS	800-538-5000
L.A. TRADE	446	M-F 8-5; SAT 10-12	800-433-3726
WORLDWIDE TECHNOLOGY	479	M-F 9-7:30; SAT 10-6	800-636-6792
NOTEBOOKS			
AMS, INC.	440	M-F 6:30-6; SAT 9-3	800-886-2671
BONDWELL	470-471	M-F 7-7; SAT 9-4	800-627-6888
COMPUTER CLIPBOARD	438	M-F 9-6	800-777-4932
HI-TECH USA	516-517	M-F 8-6; SAT 10-4 (PST)	800-831-2888
MIDWEST MICRO	451-455	M-F 9-7; SAT 10-4	800-682-7248
SUNSHINE COMPUTERS	441	M-F 9-7; SAT 10-6; SUN 12-5	800-828-2992
STORAGE			
ABERDEEN	501	M-F 7:30-6	800-552-6868
DUSTIN	456-459	M-F 6-5; SAT 10-12	800-274-6611
INSIGHT	496	24 HOURS	800-927-9921
S.AG. ELECTRONICS	460	M-F 9-7; Sat 10-4	800-989-3475
TRAINING PROGRAMS			
ABACUS	439	M-F 24 HOURS	800-451-4319
COMPUTER BOOK CLUB	481-483	M-F 9-5	717-794-2191
NRI SCHOOLS	447-449	M-F 8-5	202-244-1600

CD Do

Multiple

Duc

ext faster than you think.

Dar
you
by
P
F

mportant,
he drive's
a PhotoCD-
are being
personnel
ssurance com-
state offices,
other business-
to store and
quality photos.
nd film to a prep
it digitizes and
photos on a CD.
ives with multisess-
port so that you can
photos to the same
later.

Audio output jacks are handy for the dog-and-pony shows that you take on the road. Better drives provide a volume control directly on the drive so that you don't have to fuss with these settings in software—after your presentation has begun.

Dust is dangerous for any CD-ROM drive, so examine the drive door carefully. The best drives provide two sets of doors to keep dust out, but one tightly sealed door can be just as effective.

In a nutshell: Look for a dual-speed PhotoCD-enabled drive with fast data-transfer rates and a design that offers convenience and endurance.

PC Computing SAVINGS VOUCHER

SAVE 62% OFF THE COVER PRICE

Get pc/Computing for as little as $1.12 per issue -- and save up to 62% off the cover price, plus get "1001 PC HINTS & TIPS" - a two-disk master set containing hundreds of solutions, tricks, secrets and insider tips -- FREE with your paid subscription!

IMPORTANT: Return this voucher to start your subscription and receive a FREE BONUS!

ANNUAL COVER PRICE $35.40

YOUR OUTER YEAR RATE $14.97

YOUR FREE BONUS 1001 PC HINTS & TIPS DISKS

Basic one-year subscription $24.97; on newsstand $35.40. Canada and Mexico add $18.00. Other foreign countries add $30.00. Canadian residents add 7% GST. Allow 4-6 weeks for delivery. Payment or credit card charge must be sent with order. Price 30 days from publication date. Allow 30 days for delivery of first issue. Price subject to change without notice.

Name _____ Please Print

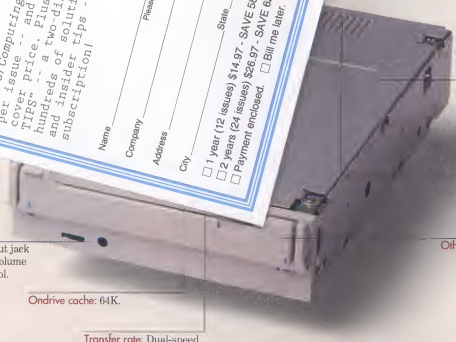
Company _____

Address _____

City _____ State _____ Zip _____

55RI3

☐ 1 year (12 issues) $14.97 - SAVE 58%
☐ 2 years (24 issues) $26.97 - SAVE 62%
☐ Payment enclosed. ☐ Bill me later.



Compatibility: High Sierra (data), CompactDisc (audio), and PhotoCD (still photography) with multisession support (MPC Level II).

Interface: SCSI.

Audio: Output jack and volume control.

Other requirements: Disk caddy (if needed).

Ondrive cache: 64K.

Packaging: Internal.

Transfer rate: Dual-speed drive: 150 Kps to 300 Kps.

Features and options: Bundled CD-ROM discs, single-handed operation.

Red flags: *Avoid proprietary interfaces and drives that don't support MPC Level II; faster CD XA CD-ROM technology will debut soon.*

Direct to You • Advertiser Index

VENDOR NAME	PAGE NO.	HOURS OPEN	
SYSTEMS			
ABERDEEN	501	M-F [illegible]	
ARES	468-469		
COMPUTER CLIPBOARD	438		
COMPUTER DISCOUNT WAREHOUSE	[illegible]		
COMTRADE	[illegible]		
CORNELL COMPUTER	49		
DEE ONE SYSTEMS	51		
EXPOTECH	461		
HI-TECH USA	516		
INSIGHT	496		
MIDWEST MICRO	451-[illegible]		
QUANTEX MICROSYSTEMS	476-4[illegible]		
USA FLEX	486-4[illegible]		
PERIPHERALS			
ABERDEEN	501		
AMDEK	503		
ARLINGTON COMPUTER PRODUCTS	484-485		
ARNET	502		
COMPUTABILITY	442-445		
DEE ONE SYSTEMS	515		
DUSTIN DISCOUNT SOFTWARE	456-459		
ELECTRIFIED DISCOUNTERS	473		
ENVISIONS	509-512		
FIRST SOURCE	480		
HI-TECH USA	516-517		
INSIGHT	496		
JDR MICRODEVICES	498		
MEGAHALLS	492-495		
MIDWEST MICRO	451-455		
TC COMPUTERS	506-507		
TIGERDIRECT	432-433		
USA FLEX	486-487		
PRINTERS			
ARLINGTON COMPUTER PRODUCTS	484-485		
BUFFALO PRODUCTS	488		
COMPUTABILITY	442-445		
COMPUTER CLIPBOARD	438		
DEE ONE SYSTEMS	515		
ELECTRIFIED DISCOUNTERS	473		
HI-TECH USA	516-517	A[illegible]	
LOGICAL CONNECTION	488	M[illegible]	
TEXAS INSTRUMENTS	450		
USA FLEX	486-487	M[illegible]	
SOFTWARE			
ABACUS	439	M-F[illegible]	
COMPUTABILITY	442-445	M-F[illegible]	
COMPUTER DISCOUNT WAREHOUSE	482-491	M-F[illegible]	
COREL	472	M-F 9-[illegible]	
DISK-COUNT SOFTWARE	518	M-F 9-[illegible]	
DUSTIN	456-459	M-F 6-[illegible]	
ELECTRIFIED DISCOUNTERS	473	M-F 9-7; [illegible]	
HI-TECH USA	516-517	M-F 8-6; [illegible]	
LANDMARK	497	M-T 8-9; [illegible]	[illegible]-8696
MICROBIZ	478	M-F 8:30-[illegible]	800-496-6789
PCZONE	499-500	24 HOURS	800-252-0386
SURPLUS SOFTWARE	508	M-F 8-5 (PS[illegible]	800-753-7877
TIGERDIRECT	432-433	M-F 8:30-1[illegible] [illegible]UN 11-5	800-888-4437
USA FLEX	486-487	M-F 24 HOU[illegible] [illegible]-SUN 9-4	800-723-0334
MEMORY			
FIRST SOURCE	480	M-F 8-5; SAT 9-3	800-429-9866
JDR MICRODEVICES	498	24 HOURS	800-538-5000
L.A. TRADE	446	M-F 8-5; SAT 10-12	800-433-3726
WORLDWIDE TECHNOLOGY	479	M-F 9-7:30; SAT 10-6	800-636-6792
NOTEBOOKS			
AMS, INC.	440	M-F 6:30-6; SAT 9-3	800-886-2671
BONDWELL	470-471	M-F 7-7; SAT 9-4	800-627-6888
COMPUTER CLIPBOARD	438	M-F 9-6	800-777-4932
HI-TECH USA	516-517	M-F 8-6; SAT 10-4 (PST)	8000-831-2888
MIDWEST MICRO	451-455	M-F 9-7; SAT 10-4	800-682-7248
SUNSHINE COMPUTERS	441	M-F 9-7; SAT 10-6; SUN 12-5	800-828-2992
STORAGE			
ABERDEEN	501	M-F 7:30-6	800-552-6868
DUSTIN	456-459	M-F 6-5; SAT 10-12	800-274-6611
INSIGHT	496	24 HOURS	800-927-9921
S.AG. ELECTRONICS	460	M-F 9-7; Sat 10-4	800-989-3475
TRAINING PROGRAMS			
ABACUS	439	M-F 24 HOURS	800-451-4319
COMPUTER BOOK CLUB	481-483	M-F 9-5	717-794-2191
NRI SCHOOLS	447-449	M-F 8-5	202-244-1600

PC Computing
P.O. Box 50253
Boulder, CO 80321-0253

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 66 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

CD-ROM Drives Deliver Multiple Data Types on Demand

Dual-speed models now access sound, video, still images, and text faster than you think.

Dancing chickens. Even if you wanted to put them in a business presentation, your PC's hard drive wouldn't have the space. To get all the words, images, and sounds you want on your desktop, you have only one economical choice: a CD-ROM drive.

True, CD-ROM drives are slower than hard drives, but we've seen real performance gains in the past year. Top performers are dual-speed drives, which distinguish between audio and data tracks on the CD. When they detect audio, the drives slow to a standard speed (so that voices don't sound like the Chipmunks). For data tracks, they double the RPM for faster performance.

Even conventional CD-ROM drives clock access times of 200 milliseconds or faster. Data transfer rates—important for multimedia applications—are reaching 300K per second or faster. And key to video performance is the drive's buffer size. With less than 64K, video sequences can have a halting effect, transforming a presentation's drama into comedy.

Performance is important, but don't forget the drive's feature set. Kodak PhotoCD-enabled drives are being snapped up by personnel departments, insurance companies, real estate offices, and scores of other businesses that need to store and access high-quality photos. It's easy: Send film to a prep house, and it digitizes and records the photos on a CD. Favor drives with multisession support so that you can add new photos to the same CD later.

Audio output jacks are handy for the dog-and-pony shows that you take on the road. Better drives provide a volume control directly on the drive so that you don't have to fuss with these settings in software—after your presentation has begun.

Dust is dangerous for any CD-ROM drive, so examine the drive door carefully. The best drives provide two sets of doors to keep dust out, but one tightly sealed door can be just as effective.

In a nutshell: Look for a dual-speed PhotoCD-enabled drive with fast data-transfer rates and a design that offers convenience and endurance.

Red flags: *Avoid proprietary interfaces and drives that don't support MPC Level II; faster CD XA CD-ROM technology will debut soon.*

So You're Not Supposed To Get Good Repro Quality From A Desktop Scanner...

Production Notes

Picture scanned at 150%, 400 dpi from a 4" x 5" transparency using the default settings. Final line screen was set in Adobe Photoshop and exported as a CMYK eps file. No color correction was made. Film was output from a Quark file at 100 line screen.

Model: RELI 9600DPI
List Price: $3495.00
Transparancy Unit: included.

OOPS!

Scanner by Relisys.

Yes, you can get wonderful color reproduction quality from a desktop scanner. Yes, you can walk into your next meeting with full, rich repros that live up to your designs. Introducing a full range family of desktop scanners designed for the designers! They're self calibrating, ready when you are, work long hours and produce incredibly accurate scanning for either the Macintosh or IBM PC platforms.

For more information call

TigerDirect

1-800-888-4437

Circle 149 on reader service card.

RELISYS
A subsidiary of TECO Corporation

Macintosh is a registered trademark of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corporation. Quark is a registered trademark of Quark, Inc. Adobe Photoshop is a trademark of Adobe Systems Incorporated.

TigerDirect® SOFTWARE MALL

800 Douglas Entrance • Suite 785 • Coral Gables, FL 33134

- Information & Order Hotlines 1-800-888-4407
- Hours: Mon.-Fri. 8am-Midnite, Sat. 9:00am-6pm & Sun. 11am-5pm (EST)
- Fax:305-529-2990 Int'l Orders: 305-443-8212
- VISA, MasterCard, American Express & Discover
- All orders are shipped via Federal Express

New! Alpha FOUR Version 3.0 Is Here!

(Get 5 customizable, ready-to-use applications with New Alpha FOUR Version 3 For Just $19.90)

Awarded for Version 2 – PC Magazine January 26 1993, DBMS December 1992, PC Computing August 1992, Home Office Computing January 1993, PC World December 1992. Awarded for Version 1.1 – PC Week May 14 1990, InfoWorld May 22, 1989, PC World March 1990.

Presenting a fresh new version of the world's most popular database for non-programmers New features include full editing access to all databases, real-time and conditional posting – and a whole lot more The database for anyone is back with a new version It's great! You've got to get your copy today

Create My Own Database Applications... Can I Do It? That's what I asked myself when I thought about building my first application Can I really do it myself? Or should I hire a programmer to do it for me?

At first I backed off and priced out some programmers Wow! Never mind I'll try and do it myself After surveying the numerous products out there I finally found the absolute best tool for creating custom applications – without the complications and time needed for writing code Alpha FOUR – the database for Non-Programmers like me New Version 3 gives me 10 times more power, increased speed and it's even easier to use!

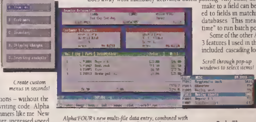
Alpha FOUR's Tutorial was magnificent – the best I've ever seen In a few short hours I was well on my way to building a powerful database solution I created my first database, complete with a colorful, custom screen and field rules that even capitalize the first letter of each word It was incredibly easy

From there I made my first application Nothing to it. Alpha FOUR let me "paint" my menu, so you know it has lots of colors and 3-D effects It looks great Using Alpha FOUR's unique applications outliner, I built custom menus for all my database work And my application runs directly from the DOS command line

Alpha FOUR has full relational capabilities too, that means it can link up to 10 databases all at one time, and make it look like they are one big database That's important because you don't want to enter data more than once Look at the Invoice screen I made for Cycle City on this page That's actually 3 separate databases 1 for the invoice information, 1 for the customer information, and 1 for the parts information If I didn't use a relational database, all that information would be unnecessarily duplicated. But with Alpha FOUR, I don't have to worry Know what I like the most about Alpha FOUR? It seems every time I need something, Alpha FOUR is right there with the answer It's always one step ahead That's a good program The kind that's perfect for people like you and me

Plus, let me tell you about the Alpha FOUR Custom Applications Pack – it's available for just $19 90 The Application Pack includes 5 ready-to-use, customizable applications, Inventory/Invoicing, CD/Video/Book Library, Membership/Fund Raising, Mailing List Management, and Business Contact Management

I've already used the Invoicing and Inventory application for my business to generate my own invoices and track my inventory, And, each application uses the new, breakthrough features available in Alpha FOUR Version 3 For example, with the new Version 3 scrollable regions feature, I get full editing access to all my databases in a set on-screen at once And now for the first time, I can see, add, edit, or delete entries in a Child database while the Parent database is on the screen



Create custom menus in seconds!

Scroll through pop-up windows to select items!

Alpha FOUR's new multi-file data entry, combined with multi-record scrollable regions on forms, real-time posting, and cascading look-ups gives you incredible power and control over your data and your business

Another handy new feature is the real-time and conditional posting This feature does away with manually-activated batch posting Any adds, deletes, and changes I make to a field can be automatically posted to fields in matching records in other databases This means no more "down time" to run batch posting operations

Some of the other Alpha FOUR Version 3 features I used in the Applications Pack included cascading lookup tables, auto advance, color control over forms, and customized menus What's more, scripts, macros, custom forms and reports are also included in the Applications Pack They're a great starting point for me I can use them as is, or modify them to meet my own business requirements

Totally dBASE Compatible. I was delighted to hear Alpha FOUR is totally compatible with dBASE .dbf files Our mailing list went right into the new application without even having to be converted! And when my Alpha FOUR application grows, it'll import those Lotus 1-2-3 files used over in accounting In fact, Alpha FOUR can import and export Lotus 1-2-3, Symphony, VisiCalc, PFS, MultiMate, WordPerfect and more

Great Looking Reports Are An Alpha FOUR Specialty! I love Alpha FOUR's "What You See Is What You Get" report writer – with just a few menu selections, you can create custom screens and printed reports to fit any need long text fields in multi-line columns with word wrapping Or format numeric fields to print out as words for the "Pay this amount" line on your blank checks

Alpha FOUR also contains built-in layout editors to create professional quality (and fully customized) letters invoices announcements – virtually any document

WHY ALPHA FOUR?

Version 3 has all this... • Full Mouse Support • Multi-File Data Entry • Scrollable Regions • Real-Time and Conditional Posting • Referential Integrity • Cascading and Conditional Lookups • Enhanced Scripting • Fully Customizable View and Browse • Menus • Color Control on Forms•

...so you can do all this: • Create and Maintain Mail/Customer Lists • Automate Inventory/Invoicing/Payroll • Create Point-of-Sales Systems • Track Mailings with Precision • Create a Time-Billing System • Create a Parts Catalog • Create Custom Sales/Prospecting Systems • Create Personnel Management Systems • Plus Much More!

ASK ABOUT THE ALPHA FOUR SERVER UNIT
You Get TWO Extra Network LAN Packs Inside Absolutely FREE! *A $1125 Value*

Windows Or DOS? You've probably heard a lot about new Windows database products like Access and Paradox for Windows They've promised you a lot but there's a big gap between the fact and the fantasy

The reality is, even if you could get your applications working in one of those programmer-oriented databases, it would run dog-slow, and would need a top-of-the-line 486 with 8 meg or more of RAM ***Alpha FOUR is still the best way to manage your data today.***

DOS-based Alpha FOUR loads 10 times faster, runs two or three times faster (indexing, scrolling, etc), works on any PC you've already got, and is flat out easier to design relational database applications with, than any Windows database out now Using the new version, you can do things users of current Windows databases will never do and expert dBASE or Paradox programmers can't do without months and months of programming You'll run your database solutions on any PC at blazing speed And you'll do it all without the hardship of programming

Increase Productivity – Just $19.90

With Alpha FOUR Version 3.0 you can purchase a Custom Application Pack – We've made new Alpha FOUR Version 3 even more productive than you dreamed possible The 5 customizable, ready-to-use applications demonstrate all of Version 3's new power These 5 applications will work on a single PC or on a network with all of your networked Alpha FOUR users accessing them at once Use them as is, or as a starting point for your own custom applications Each application includes scripts, macros, custom forms, reports and uses many of the new features available in Alpha FOUR Version 3 These applications will save you time and make you productive almost immediately. They're also excellent learning tools Applications included Inventory/Invoicing, CD/Video/Book Library, Membership/Fund Raising, Mailing List Management Business Contact Management

FREE WITH Alpha FOUR

ZIP Code Database – A complete database containing over 41 000 United States ZIP Codes, cities and states included in Alpha FOUR Maintain your mailing list with surprising ease, print labels for massive mailings, even eradicate duplicates automatically Anyone can benefit from this handy database Not just a lightweight add-on, this fully functional application includes every ZIP Code, in the United States When you type in the ZIP Code, this beauty fills in the city and state automatically! Now that's powerful ease-of-use You could spend hundreds for a separate mailing program just like this But it's yours free with Alpha FOUR It's perfect for keeping your names and addresses, mailing list, sales contacts and more You'll love the easy menus and fast action, especially when dealing with large files

HERE'S WHAT YOU GET:

Alpha FOUR (Single User/Competitive Upgrade)	worth $495 00
Zip Code Database	worth $49 00
Total Value	**$544.00**

ALL FOR JUST $79.90

TIGER'S ALPHA FOUR 3.0 SUPER BUNDLE

BGV A06-1300	**Alpha FOUR Version 3.0 Non-Networkable** with Zip Code Database	**$79.90**
BGV A06-1305	**Customs Applications Pack**	**$19.90**
BGV A06-1310	**Alpha FOUR Network Pack** Includes Network Server and 2 Free Network LAN Packs	**$369.00**

Ask your Tiger Representative about the Alpha FOUR Easy Learning Tapes Library
Please specify 3 5" or 5 25" diskette size when ordering

Compact Shredder

Don't let discarded documents fall into the wrong hands; protect your privacy with the Compact Shredder from Info Systems. Just plug it in and you're ready to shred documents up to 11" x 17" in just seconds!

BHG I08-1030 **Compact Shredder** **$69.90**

Pixar One Twenty Eight

These textures are ideal for adding impact and style to designs Designed exclusively for computer graphics, each Pixar texture was photographed from an original material sample These textures can be used with any of the popular page layout, paint, and presentation software packages that read TIFF files

BHG4414 **Pixar One Twenty Eight** **$179.90**

Intel PCMCIA Faxmodem Cards

PCMCIA Faxmodem Cards are revolutionizing the way people are using their notebook and new-generation PCs with the wafer-thin 2400, 9600 and 14.4 bps models. Just slip in the credit card-sized adapter, connect to a phone line and you're on the air

BHG I05-6003 **Intel PCMCIA 14.4 Faxmodem Cards** **$379.90**

Sound Machine

Includes a 100% sound Blaster and AdLib compatible sound card with genuine Sound Blaster Chipsets, 11-voice FM music, digitized voice input/output, DMA and hardware decompression, full duplex MIDI interface, built-in amplifier with 4W per channel output, volume control, free software and much more!

BHG Q01-1001 **Sound Machine** **$99.90**

Power Translators

Power Translator 2.0 from Globalink is *the* choice in translation software, tested and proven every day by thousands of users. Includes menu-driven, bilingual screens; a new Grammar Module, a modifiable, 250,000+ word/phrase dictionary, and more *(Specify Spanish, German or French.)*

BHG5212 **Power Translators** **$199.90**

Listen For Windows 1.1

Listen For Windows outperforms all other voice recognition system in accuracy. The secret? Continuous speech recognition This allows you to speak in your normal voice, at your normal speed – and command your PC. You can train Listen For Windows to recognize over 300 words

BHG V06-1001 **Listen For Windows 1.1** **$399.90**

MIDIScan

Here's the breakthrough many of you have been waiting for! New Music-reading scanner technology automaticlaly converts scanned images of printing music into MULTI-TRACK MIDI files! Just scan it and play it! MIDIScan is the fastest way to input notes into MIDI format Captures virtually any type of score

BHGM15-1000 **MIDIScan Software** **$199.90**

BodyWorks/PharmAssist

BodyWorks: your body's systems, structures and functions in detail. PharmAssist a guide to medicines of today

BHG4101 **BodyWorks** **$29.90**

BHG4307 **PharmAssist** **$49.90**

Message Port

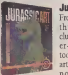
The first fax/modem sharing software for networks running Windows. This means receiving faxes on the network and routing them as easily as e-mail, sending faxes from any PC on the network, and much more – using a standard fax/data modem, not a special LAN faxmodem *(Other configurations available, please call)*

BHG N05-1003 **Message Port 2-user** **$29.90**

ImageBase

Here's one of the hottest clip art libraries in the industry, now available on CD-ROM! Metro ImageBase contains 2,000 eye-catching black & white illustrations, designs, borders, cartoons, logos and more.

BHG M04-2220 **Metro ImageBase.** **$82.50**



Jurassic ART

From Arts & Letters, this program includes line and Bezier-curve drawing tools, over 400 Flex-art images, and a Dinosaur Database info/illustrations of over 300 dinosaurs Plus, you get a booklet – "The Age Of Dinosaurs", creative samples, prehistoric scenery and 9 custom typefaces including "Dinosauria."

BHGC08-1000 **Jurassic ART Image Collection** **$39.90**

PC Powered MultiDisk 150

Put all your data on this whopping 150MB transportable removable drive. And talk about FAST – its 24 megabits per second transfer rate and effective 9ms access time set new records! The MultiDisk 150 can use any of five available disk sizes: 150, 105, 90, 65 and 35MB plus read existing 44MB for total compatibility.

BHG6511A **PC Powered MultiDisk 150** **$529.90**

Stop&Go!

Stop&Go! simplifies your PC's start-up and shutdown operation – you can actually stop work, shut down your computer, without waiting endlessly for Windows to close, and turn it on the next morning – at the exact spot you left off! All applications are ready to go. It's exactly like you never left

BHG E06-1000 **Stop&Go from Engram** **$89.90**

Images Incorporated

This desktop publishing tool actually performs three functions: First, Images Incorporated III for Windows is an ultra-high fractal image compression application. Second, it enhances image resolution by using fractal prediction And third, it performs fast reliable image file format conversions

BHG I06-1000 **Images Incorporated III** **$99.90**

Ballade

Ballade for Windows is fast and easy. The Standard Notation is the best we've seen. Cut, copy, paste, erase and merge sections of your musical score. You can even enter notes and move them with your mouse. It's features are too numerous to mention. *(Comes with one free MIDI file collection of your choice Call for details)*

BHG D08-3001 **Dynaware Ballade** **$99.90**

Circle 241 on reader service card.

Don't settle for less than these specs:

Hard Drives

Performance: 13ms or faster access time, 4 MBps or better transfer rate. If drive performance is reported as seek time, look for 10ms or faster.

Capacity: 230MB or greater.

Size: Half height or full height, depending on your system's drive space.

Interface: IDE for desktop systems with up to 1GB of capacity. For larger capacities, get a SCSI drive interface.

Features and options: Self-parking heads, diagnostic and partitioning software.

Cache or buffer: 64K to 256K.

Red flags: *Mounting brackets and cables should come with the disk; look for a 30-day, full money-back guarantee and a two- or three-year warranty.*

Sound Cards

Compatibility: Sound Blaster.

Mode: Stereo.

Card type: Internal.

Sampling capability: 16-bit record and play (MPC Level II standard).

Maximum sampling rate: 44.1KHz.

Synthesizer: Wave or FM with Wave option.

Bundled software: Windows and DOS utilities for playing, recording, and editing digital and MIDI files.

Ports: Speaker, microphone, and joystick.

Features and options: Onboard digital signal processor for compression and processing, SCSI port for a CD-ROM drive.

Red flags: *Avoid cards that play but can't record 16-bit sound; avoid proprietary (non-SCSI) CD-ROM interface.*

Subnotebook PCs

CPU: 25MHz 486.

Display type: 7½-inch backlit passive- or active-matrix LCD.

Weight: 4 pounds or less.

Size: Under 8¼ by 11 inches.

Keyboard: 90 percent of full-size keyboard.

RAM: 8MB expandable to 16MB.

Hard drive: 40MB or larger.

Features and options: Removable hard drive, high-speed internal fax modem, integrated pointing device, infrared keyboard connection.

Other requirements: External floppy drive, at least one Type II PCMCIA slot, small recharger (5⅝ by 3 by 1¼ inches or less).

Red flags: *Subnotebook displays and keyboards entail compromise—try before you buy, or make sure there's a money-back guarantee with no restocking charge.*

Notebook PCs

CPU: 25MHz 486.

Display type: 9½-inch or larger backlit monochrome LCD, dual-scan passive-matrix or active-matrix color preferred.

Weight: Under 6 pounds for mono, under 7 pounds for color; battery charger under 1 pound.

Size: Smaller than 10 by 12 by 2 inches.

RAM: 8MB expandable to 20MB.

Hard drive: 120MB.

Ports/slots: Parallel, 9-pin serial, PS/2 slots; one PCMCIA Type III slot or two Type II slots.

Features and options: Ability to swap out floppy drive for second battery, removable hard drive, user-installable RAM, integrated pointing device.

Other requirements: Standby mode, pop-up battery gauge, 6-by-3-by-3-inch battery recharger.

Network Servers

CPU: Intel Pentium, 486DX2/66, or 486DX/50.

RAM: 16MB expandable to 64MB.

CPU RAM cache: 256K.

Display: 14-inch Super VGA color or monochrome.

Video card: Super VGA with 512K of RAM.

Hard drive: 1GB SCSI-2.

Drive bays: Two full-height 5¼-inch bays, two half-height 5¼-inch bays with front-panel access, two 3½-inch bays.

Bus: Eight EISA slots, including two VL-Bus slots.

Features and options: RAID-5, DAT backup, uninterruptible power supply.

Other requirements: FCC Class A or better, UL listed.

Red flags: *Avoid ISA bus, slotted RAM, machines without CPU upgrade sockets, 80ns or slower RAM.*

Windows Displays

Size: 17 inches; 20 to 21 inches for graphics applications.

Resolutions: 1,024 by 768; 1,280 by 1,024 for 20- or 21-inch monitors; noninterlaced.

Dot pitch: 0.28mm for 17-inch monitors; 0.31mm for 20-inch.

Vertical refresh rate: 72Hz at all resolutions.

Tube type: Flat-square or Trinitron.

Controls: Front-panel digital image controls.

Features and options: Support for MPR-2 low-emission standards, microprocessor-based controls for image-setting storage, EPA Energy Star compliant.

Other requirements: Adjustable tilt-and-swivel base, video cable, antiglare coating or add-on filter.

Red flags: *Avoid monitors with dot pitch greater than 0.31mm and limited or inaccessible controls.*

Windows Accelerator Cards

Resolutions: 1,024 by 768; 1,280 by 1,024 for 20-inch monitors.

Colors: 256 colors at 1,024-by-768 resolution for business apps; 65,000 colors at 1,024 by 768 for near-photo-quality images.

Accelerator chip: Fixed-function chip such as S3 86C801, IIT AGX014, or ATI 68800 (Mach 32).

Vertical refresh rates: 72Hz at all resolutions.

RAM: 1MB for 256 colors at 1,024 by 768; 2MB or more for higher resolutions and more colors.

Features and options: VL-Bus model option, Windows utility to switch resolutions and colors.

Other requirements: Driver installation software, 2-year warranty, Windows 3.1 drivers, free driver updates via BBS, CompuServe, or mail.

Red flags: *Avoid interlacing and boards that support only 70Hz vertical refresh rates.*

24-Bit Color Cards

Resolutions: 1,024 by 768 or higher.

Colors: 16.7 million colors at 1,024-by-768 or 1,152-by-870 resolution.

Graphics processor: For 24-bit Windows applications, a fixed-function processor; for 24-bit DOS apps, a full-fledged graphics coprocessor (TI34020 chip).

Vertical refresh rates: 72Hz at all resolutions.

RAM: 4MB.

Drivers: For Windows 3.1 and your specific DOS apps.

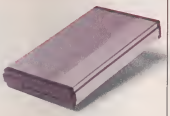
VGA support: Onboard VGA chip.

Features and options: VL-Bus or EISA model option, Windows utility to switch resolutions and colors.

Other requirements: 2-year warranty; free driver updates via CompuServe, BBS, or mail.

Don't settle for less than these specs:

All-in-One Modems



Transmission rate: 14,400 bps without compression, 57,600 bps with compression.

Supported standards: V.32bis (data speed), V.42 (error correction), V.42bis (data compression), CCITT Group 3 Class 1, Class 2, and CAS (fax).

Compatibility: Hayes.

Port selection: COM1 through COM4.

Bundled software: DOS and Windows communications and fax software, OCR software.

Features and options: Integrated voice, data, and fax; onboard digital signal processor and coprocessor; 16550 universal asynchronous receiver/transmitter; LCD display on external modems; upgradable to V.Fast protocol.

Red flags: *Avoid fax modems without fallback transmission-rate capabilities.*

Ethernet Network Adapters

Card type: 16 bit, ability to auto-configure to 8 bit.

Network support: NetWare, LAN Manager, LAN Server, Windows for Workgroups, Windows NT.

Drivers: Eagle NE2000–compatible drivers, support for NDIS and ODI drivers.

Media connectors: For 10Base5 (Thicknet), 10Base2 (Thinnet), and 10BaseT (RJ-45); automatic sensing of media configuration.

Installation: Should be software configurable and support interrupt levels above IRQ 7.

Features and options: Upgradable boot PROM; SNMP support; polarity, collision, and link status LEDs; bus-mastering interface.

Other requirements: Diagnostic utilities, slot-bracket-mounted transmission and reception LEDs, 16K or larger buffer.

Desktop Laser Printers

Emulations: PCL 5, PostScript option with automatic emulation switching and all ports active.

Print engine speed: 8 ppm.

Resolution: 600 dpi.

Resident fonts: 45 total; 10 TrueType fonts (matching Windows 3.1).

RAM: 2MB.

Interface: Bidirectional parallel.

Paper capacity: 200 sheets.

Footprint: 260 square inches or less.

Features and options: HP-compatible font cartridges and slots, RISC processor for 600-dpi printers.

Other requirements: Toner cartridge, parallel cable.

Red flags: *Toner should be included; avoid proprietary cartridge slots.*

Color Thermal Wax-Transfer Printers

Emulations: PostScript Level 2.

Print speed: 1 ppm.

Resolution: 300 dpi.

Processor: 16MHz RISC.

Printer language: PostScript Level 2.

RAM: 4MB.

Interface: Parallel.

Fonts: 35 Adobe Type 1.

Ribbon: Three-color transfer ribbon.

Features and options: Internal network interfaces, support for four-color (three colors plus black) ribbons.

Other requirements: RAM expandable to 8MB, network interfaces.

Red flags: *Be sure vendor provides a PostScript Level 2 driver; despite some claims, business-quality printing on plain copier paper isn't a reality yet.*

PC/Computing (ISSN 0899-1847) is published monthly by Ziff-Davis Publishing Company, a division of Ziff Communications Company, One Park Ave., New York, NY 10016. Second Class postage paid at New York, NY 10016 and at additional mailing offices. Postmaster: Send address changes to *PC/Computing*, P.O. Box 58229, Boulder, CO 80321-8229. Printed in the U.S.A. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 278513. The Canadian GST registration number is R129049673.

Network Laser Printers

Emulations: PCL 5, PostScript Level 2 with automatic emulation switching.

Print engine speed: 20 ppm.

Resolution: 600 dpi.

Processor: 16MHz RISC.

Resident fonts: 90 total: 10 TrueType (matching Windows 3.1), 45 PCL 5, 35 PostScript.

RAM: 8MB.

Interfaces: Parallel and 10BaseT or 10Base2 Ethernet, Token-Ring, or LocalTalk.

Network support: Concurrent support of NetWare, Windows NT, Windows for Workgroups, LAN Manager, LAN Server.

Paper capacity: 1,000 sheets.

Warranty: One year with onsite service.

Features and options: SNMP support.

Single-User Tape Drives

Storage capacity: 250MB when compressed.

Packaging: Internal 3½-inch drive preferred; external for PC-to-PC portability.

Interface: Floppy drive, IDE, or SCSI.

Cartridge type: DC6525 or equivalent, preformatted.

Bundled software: Windows and DOS backup software that supports either QIC-80 or QIC-525 tape format.

Other requirements: Floppy interface splitter or other interface cable, mounting hardware for internal drives.

Red flags: *Ensure full QIC-80 compatibility for QIC drives; avoid proprietary controller cards; avoid paying more than a dollar per megabyte of compressed storage capacity.*

Desktop Systems

CPU: Intel 486DX2/66 upgradable.

Secondary cache: 256K four-way set-associative.

Memory: 8MB expandable to 32MB, 36-bit SIMMs.

Hard drive: 230MB or larger IDE.

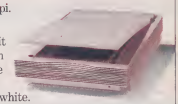
Video: VL-Bus Windows accelerator, 15-inch monitor or larger with 72Hz refresh at 1,024 by 768 pixels.

Slots: Eight ISA slots for full-size case (including two VL-Bus), three ISA slots for small-footprint case with integrated VL-Bus video and drive.

Drives and bays: One 3½-inch 1.44MB and one 5¼-inch 1.2MB floppy drive, five half-height 5¼-inch bays.

Red flags: *Pentium-upgradable systems should include CPU, secondary CPU cache, and memory on a daughtercard rather than the motherboard; avoid Micro Channel and proprietary local-bus slots.*

Flatbed Color Scanners



Resolution: 400 to 600 dpi.

Image scanning capabilities: 24-bit color (16.7 million colors), grayscale (256 shades of gray), black and white.

Compatibility: TWAIN.

Interface: SCSI or SCSI-2.

Image controls: External controls for adjusting brightness, contrast, and color of scan; adjustable resolution.

Bundled software: 24-bit image-editing software, OCR software.

Features and options: Automatic document sheet feeder, transparency feeder.

Other requirements: Cables and SCSI adapter card included in price.

Red flags: *Avoid models that require multiple passes to scan color documents.*

COMPUTER CLIPBOARD HAS THE NAME-BRAND PRODUCTS YOU WANT — AT PRICES YOU JUST CAN'T BEAT!

Printers

HEWLETT PACKARD

DeskJet 1200C

LaserJet 4L - *New!*
6 ppm, 300 dpi, 1 MB RAM, 100 sheet input tray, 2 available & 14 bit-mapped Fonts ... $649

LaserJet 4ML - *New!*
6 ppm, 300 dpi, 2 MB RAM, Adobe Postscript Level 2, 100 sheet input tray, 8 available & 14 bit-mapped Fonts $1019

LaserJet 4
4 ppm, 600 dpi with RET, 2 MB RAM, 250 sheet paper tray & 100 sheet paper holder, 45 scalable fonts ..... $Call

LaserJet 4ML

LaserJet 4M
4 ppm, 600 dpi with RET, 6 MB RAM, Postscript, 250 sheet paper tray, 100 sheet paper holder, 45 scalable fonts, Appletalk, Parallel & Serial interface standard $1866

LaserJet 4SI - *New!*
17 ppm, 600 dpi with RET, 8 MB RAM, Dual 500 sheet paper trays, 45 scalable fonts, easily upgradable, uses your so-dimm memory $3895

LaserJet 4SI MX - *New!*
17 ppm, 600 dpi with RET, 6 MB RAM, Dual 500 sheet paper trays, 45 scalable fonts, Postscript Level 2, Appletalk, Parallel & serial interfaces standard, easily upgradable, uses your so-dim memory ..... $Call

DeskJet 1200C - *New!*
300 dpi color inkjet, 8 ppm text, 2 ppm graphics, 2 MB RAM, 45 scalable Truetype fonts $1365

DeskJet 1200C/PS - *New!* ✓
300 dpi color inkjet, 8 ppm text/2 ppm graphics, 6 MB RAM, 35 Adobe Postscript fonts, 45 Truetype fonts, Apple LaserTalk interface ..... $Call

DeskJet Portable
300 dpi lasers-quality printing in a 4.4 lb portable package, includes 6 fonts ..... $Call

DeskJet 500/DeskWriter
300 dpi, 4ppm, laser-quality output at a dot matrix price
DeskJet 500 (PC) ..... $Call
DeskWriter (MAC) ..... $Call

DeskJet 510/DeskWriter 510
Details on this new printer were unavailable at press time! Please call your nearest rep for pricing and availability!
DeskJet 510 (PC) ..... $Call
DeskWriter 510 (MAC) ..... $Call

DeskJet 550C
300 dpi color inkjet, 4 ppm, 6 typefaces, 13 scalable fonts for use with Windows 3.1 ..... $695

PaintJet XL 300 Color Printer
300 dpi color inkjet, 1.5 ppm, A & B sizes sub-sheet and transparency capabilities, PCL 5 and HP-GL 2 language, 2 MB RAM, PC & MAC interfaces ..... $Call

Laptops & Notebooks

HEWLETT PACKARD

OmniBook 300 - *New!*
25/20 Mhz, 2 MB RAM, Microsoft Windows, Word and Excel and Laplink bundled into ROM, removeable hard disk, flash disk storage and infrared communications capabilities, built-in pop-out mouse, "Instant-On" feature, 9 inch mono VGA screen, 5 hour battery life, lose these 3 lbs with battery
OmniBook 300 with 40 MB HDD $2749

Palmtop 100LX
1 MB RAM, DOS 5.0, Lotus 1-2-3, ac/Mail, appointment book and phone book software pre-loaded. Features HP Rescuelink calculator with CGA screen. 11 ounces $699

Apple

PowerBook 165 - *New Product!*
Details were unavailable at press time. Please inquire with your sales rep on specs, pricing & availability! ..... $Call

PowerBook 180
68030, 33 Mhz, 4 MB RAM, 1.44 MB FDD, System 7, Active Matrix Mono Screen, 6.5 lbs.
80 MB HDD/80 MB HDD ..... $3329/$2749

PowerBook 180c
68030, 33 Mhz, 4 MB RAM, 1.44 MB FDD, System 7, Active Matrix Color Screen, 6.8 lbs.
80 MB HDD/160 MB HDD ..... $3919/$3266

EVERY MACINTOSH INCLUDES: System 7 software, Apple Superdrive 1.44 MB FDD, Appletalk, SCSI port, ADB port, Built-in sound and video. (Monitor and Keyboard are not included in system pricing.)

Apple

Macintosh LC III
68030, 25 Mhz, 4 MB RAM, 512K VRAM
80 MB HDD/160 MB HDD ..... $1129/$1369

Centris 610
68040, 20 Mhz, 4 MB RAM, 512K VRAM, built-in Ethernet on 230 MB Models
4 MB RAM with 230 MB HDD $1995
4 MB RAM with 230 MB HDD & CD-ROM $2325

Centris 650
68040, 25 Mhz, 4 MB RAM, 512K VRAM, 3 NuBus slots, built-in Ethernet on 230 MB Models
80 MB HDD (no ethernet or FPU) $1475
4 MB RAM with 230 MB HDD $2175
4 MB RAM with 230MB HDD and CD-ROM $2499

Centris 660AV - *New Product!*
68040, 25 Mhz, 8 MB Ram, 56 Mhz digital signal processor, built-in math co-processor, 1 MB VRAM, 16-bit color, built-in Ethernet, and sound generator
with 230 MB HDD $2189
with 230 MB HDD & CD-ROM $2465
with 500 MB HDD & CD-ROM $2825

Quadra 800
68040 with math co-processor, 33 Mhz, 8 MB RAM, 1 MB VRAM, 3 NuBus slots, built-in Ethernet on all models
230 MB HDD $3145
500 MB HDD with internal CD-ROM $3999

Quadra 840AV - New Product!
68040, 40 Mhz, 8 MB Ram, 56 Mhz digital signal processor, built-in math co-processor, 1 MB VRAM, 16-bit color, built-in Ethernet and sound generator
with 230 MB HDD $4996
with 230 MB HDD & CD-ROM $5429
with 160MB RAM & 500 MB HDD $4325

Quadra 950
68040 with math co-processor, 33 Mhz, 32-bit data bus, 8 MB RAM, 24-bit accelerated graphics with 1 MB VRAM, 5 NuBus slots, built-in Ethernet on all models
230 MB HDD $3715
500 MB HDD $4255

Apple StyleWriter II
360 dpi inkjet printer, 1 ppm, 99 scalable fonts, 100 sheet paper tray, serial interface $329

Apple LaserWriter Pro 600
300 dpi enhanced with FinePrint, 8 ppm, 4 MB RAM, 2 MB ROM, 64 scalable fonts, 250 sheet cassette tray, 100 sheet multi-purpose tray, Appletalk, Centronics & Serial interface standard, optional PostScript Upgrade Kit available. $1895

Apple

Apple LaserWriter Pro 630
300 dpi enhanced with FinePrint and PhotoGrade, 8 ppm, 8 MB RAM, 2 MB ROM, 64 scalable fonts, 250 sheet cassette tray, 100 sheet multi-purpose tray, Appletalk, Centronics & Serial interfaces standard $2295

Printer Accessories

1,2 or 4 MB Memory Upgrade for
LaserJet IIP, IIIP ..... $Call
1,2, or 4 MB RAM for IIISi/4/4Si ..... $Call
HP Postscript Cartridge (Level II) $899
HP Postscript Cartridge (Level 2) $466
HP Postscript SIMM for IIISi/4/4Si ..... $Call
HP Laserset and Inkjet Fonts ..... $Call
Laser Cassette Tray for IIP/IIIP $189
Envelope/Legal/Letter Trays for IIP/IIP/IIIP/IIIP $89

Scanners and Fax Machines

ScanJet IIp
300 dpi flatbed scanner, 256 grayscales, interfaces & graphic scanning software included (specify PC, MAC or PSF2 interface) $799
☐ **ScanJet IIp with OmniPage Direct OCR software** $995

ScanJet IIx - *New Product!* ✓
Details on this new product were unavailable at press time. Please call your rep for pricing and availability! ..... $Call
☐ **ScanJet IIx with OmniPage ... Professional OCR software** ... $Call

HP FAX 900 - *New Product!*
300 dpi enhanced plain-paper output with 30 page Automatic Document Feeder, 50 auto dial numbers, broadcasting, polling and copy capabilities. Does not include phone handset ..... $Call

HP FAX 910 - *New Product!*
300 dpi enhanced plain-paper output with 30 page Automatic Document Feeder, 100 auto dial numbers, broadcasting, polling and copy capabilities. Includes phone handset and SIZE ..... $Call

CHECK OUT THE CLIPBOARD!

- ✓ 15 DAY MONEY BACK GUARANTEE
- ✓ NO CREDIT CARD SURCHARGES!
- ✓ SAME DAY SHIPPING
- ✓ KNOWLEDGEABLE SALES STAFF
- ✓ COMPANY CHECKS ACCEPTED
- ✓ ON-SITE SERVICE AVAILABLE
- ✓ TOLL-FREE TECHNICAL SUPPORT
- ✓ NO SALES TAX (OUTSIDE VA)
- ✓ CORPORATE, GOVERNMENT, EDUCATIONAL AND HOSPITAL PURCHASE ORDERS ARE WELCOME!

OUR PLEDGE

IF YOU ARE NOT ABSOLUTELY SATISFIED WITH YOUR PURCHASE, PLEASE RETURN IT TO US UNDER THE TERMS OF OUR 15 DAY MONEY BACK GUARANTEE!
(SHIPPING FEES ARE NOT REFUNDABLE)

COMPUTER CLIPBOARD

CALL US TOLL-FREE AT: **(800) 777-4932**

Terms & Conditions:VISA, MasterCard and Discover accepted without surcharge. We check thoroughly for stolen credit cards. Credit Card orders will be shipped to the billing address only. COD shipments are made for Cash or Money Order only. Orders prepaid by personal check please allow 10 business days for processing. Add 4.5% tax for orders shipped to Virginia. Corporate, Government, Educational and Hospital P.O.'s are welcome. Corporate P.O.'s accepted from organizations with a D&B rating of 3-A-2 or better. Selected products available on the GSA Schedule. Please call for more information regarding GSA purchases. Price and availability subject to change. Please call to confirm most current pricing. Not responsible for typographical errors appearing in this advertisement.

SoftCollection

High Powered Software without the High Price

The Frugal Desktop Publisher

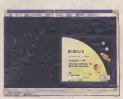
Create newsletters, brochures, ad literature, and more with this **feature-filled** Windows page layout package.
Bezier curve drawing, polygon filling, import graphics, change fonts, add designs, more.
Item# B217 $19.95.

The New *Soft*Collection from Abacus

Don't Forget Graphics

Add Impact with Graphics
Each package contains a collection of 100+ ready-to-use, professionally created clipart in PCX format.
Item# B224 $15.95 *Collection 2*
Item# B225 $15.95 *Collection 3*

Art Masterpieces on Your PC
From Monet and VanGogh to Michaelangelo and others, their work is here for you to use in BMP format.
Item# B226 $15.95.



Astronomy StarFinder for Windows!
Turn your PC into a Windows planetarium. Complete database of 10,000 stars (with technical info) from 200 places worldwide.
Item# B215 $19.95.

Work Faster and Easier with Floppies
One-pass diskette copy, multiple diskettes, copy 3-1/2" to 5-1/4" and vice versa, much more.
Item# B211 $18.95.

Windows Tune Up
Analyze and reconfigure your system to supercharge Windows with this slick, convenient group of utilities.
Item# B216 $18.95.

Personal Data File Manager
Manage your addresses, contacts, books, VCR tapes and more. This fast and simple database manager has a report generator and more.
Item# B222 $17.95.

DataCruncher
Fast access to all compression programs. Here's a simple way to run PKZIP, LHARC, ARJ and others from Windows. Pack and unpack quickly without problems.
Item# B214 $17.95.

Windows Icon Editor
Create, personalize and change icons for your own taste. Works with EXE and DLL files. With icon library and screen capture to a 32x32 icon, more.
Item# B219 $17.95.

Run Windows Without a Mouse
Software that cuts the mouse cords from your notebook computer. Navigate with cursor keys. Superfast, adjustable speed, works with all Windows applications.
Item# B212 $19.95.

Make Windows Scream, Literally
With sounds, effects and wave manager. Windows becomes lively and fun with 40+ new sounds.
Item# B221 $19.95.

Puzzles, Pranks, Toys and Games for Windows
Outrageous puzzles, pranks and games that will make everyone laugh. The most hilarious collection of fun yet for Windows.
Item# B227 $19.95.

Original Software, Not Shareware. Available at book and software stores everywhere or have your dealer call us. To order directly call 1-800-451-4319.

Order Toll Free 1-800-451-4319

Abacus
Dept P11, 5370 52nd Street SE, Grand Rapids, MI 49512
Phone: (616) 698-0330 • Fax: (616) 698-0325

See Us At
COMDEX/Fall '93
Las Vegas Convention Center Booth #100
November 15—19, 1993
Las Vegas, Nevada USA

Please rush me the following items:

Item#	Title	Price

Subtotal _____
MI orders include 4% sales tax _____
In US & Canada add $5.00 shipping _____
Foreign orders add $13.00 per item: _____
Total amount (US funds) _____

For fast delivery Order Toll Free 1-800-451-4319 EXT. 1611, or FAX (616) 698-0325
Or mail this coupon to: Abacus, 5370 52nd Street SE, Grand Rapids, MI 49512

Method of Payment: ❑ Visa ❑ Master Card ❑ Am.Express ❑ Check / M.O.
Card#: _____ Expires: ____/____
Name: _____
Company: _____
Address: _____
City: _____ State: ____ Zip: _____
Phone#: _____ Fax#: _____

❑ Yes, please rush your free catalog of PC books and software. Dept P11

Circle 111 on reader service card.

3 Great Reasons To Buy an AMS Notebook

Fully Upgradable · 66MHz · 32MB RAM · Local Bus Video · 13 Million Winmarks

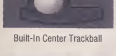
TravelPro 5300

- Choice of Upgradable Intel CPU's 486SX-25, 486DX-33, 486DX2-50 & 486DX2-66
- Available in Active Matrix, Dual Scan Passive Matrix or Monochrome Displays
- Local Bus Video Fastest Performance of any Notebook
- Built-in Center Trackball
- PCMCIA Type III
- Upgradable CPU, RAM & Display
- Over 3 hours of Battery Life
- 5.9 lbs Mono - 6.3 lbs. Color
- Removable 80MB Hard Drive (120 - 340MB Avail)
- Optional Internal Fax/Modem
- Optional Docking Station

	Prices Starting At
5325 25MHz Active Matrix	$3325
5325 25MHz Dual Scan Passive	$2350
5325 25MHz Monochrome	$1675

Removable Hard Drive

Built-In Center Trackball


PCMCIA Type III Slot

Ergonomic · DX-33 CPU Speed
9.5" Active Display

TravelPro 7000

7525

- Low Power CPU 486SL-25 CPU DX-33 Speed
- Available in Active Matrix or Monochrome Displays
- Large 25mm Built-in Center Trackball
- PCMCIA Type III Slot
- Up to 4 hours of Battery Life
- 6.3 lbs. Mono 6.6 lbs. Color
- 4 MB RAM - Expand to 20
- Removable 120MB Hard Drive (120 - 340MB Available)

	Prices Starting At
7525 Active Matrix	$3395
7525 Monochrome	$1895

7325

- Low Power CPU P-23 486SX-25 Processor
- Available in Dual Scan Passive Color or Monochrome Display
- Large 25mm Built-in Center Trackball
- Over 3 hours of Battery Life
- 5.9 lbs Mono - 8.3 lbs. Color
- 4 MB RAM - Expand to 20
- Removable 80MB Hard Drive (120 - 340MB Available)
- Built In 9600/2400 Internal Fax/Modem

	Prices Starting At
7325 Dual Scan Color	$2250
7325 Monochrome	$1575

The AMS Advantage

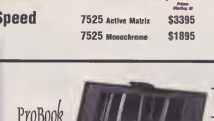
intel inside

- *FREE SHIPPING Via Federal Express Economy*
- *30 Day Money Back Satisfaction Guarantee*
- *1 Year Warranty on Parts & Labor*
- *Lifetime Toll-Free Technical Support*
- *24 Hour On-Line BBS*

Here at AMS we stay on the cutting edge of technology to bring you the best selection of the newest features available in mobile computing. We've listened to our customers and know what they want; more powerful CPU's, better expandability, easy upgradability, longer battery life, lightweight design, larger capacity hard disk storage, built-in pointing devices, docking stations and an eye of ergonomics and ease of use. All backed by the industries best standard and premium support services.

See Us at Comdex Fall - Booth # 5534

ProBook 4&5



The Value Series

ProBook

- Upgradable Intel 486DX-33 DX2-50 or 486DX2-66 CPU (Probook 5 only)
- 10" 84 Greyscale Monochrome Display
- Built-in Center Trackball
- 5.5 lbs. Including Battery
- 4 MB RAM - Expand to 6MB
- 80MB Hard Drive (120 - 340MB Available)
- Optional Internal Fax/Modem

	Prices Starting At
ProBook 5 / DX-33	$1595
ProBook 4 / 486-33	$1395

AMS

4905 Little John Street Unit A, Baldwin Park CA 91706
Tel: (818) 814-8851 Fax: (818) 814-0782
Hours Of Operation: 6:30am - 6:00pm M-F
9:00am - 3:00pm Saturday PST

1-800-886-2671

We accept MC, Visa and Amex with no surcharge. Prices do not reflect sales tax charges or shipping/handling. Free shipping services are sent via Federal Express Economy and are free within the continental U.S. All return shipments require an RMA number prior to shipment and must be sent pre-paid, insured and in original packaging. Damages due to negligence, abuse or misuse are not covered by the Money Back Guarantee. Returns made after 30 days will be subject to a restocking charge. AMS is not liable for errors in typography or photography. Specifications and prices are subject to change without notice. The Intel Inside Logo is a trademark of Intel Corporation.

Corporate, Dealer & Goverment Pricing Available

MasterCard VISA

Circle 206 on reader service card.

SUNSHINE COMPUTERS

FLORIDA'S LARGEST AUTHORIZED DEALER FOR COMPUTERS

Searching for a brand name you can really trust? Sunshine delivers.

TOSHIBA T1900
AUTHORIZED DEALER
- 486/20MHz
- 200 Meg H.D.
- 120 Meg H.D.
- T1900C
- IN STOCK

CALL

TOSHIBA T4500
AUTHORIZED DEALER
- 486/20MHz
- VGA Mono Screen
- 120 Meg H.D.
- T4500C
- 200 Meg H.D.
- IN STOCK

CALL

TOSHIBA T4600C
AUTHORIZED DEALER
- 486/33MHz
- 120 Meg H.D
- 200 Meg H.D.
- 4 Meg RAM
- 340 Meg H.D.
- IN STOCK

CALL

TEXAS INSTRUMENTS
- TM 4000 WIN SX25 • WIN SLC/25
- TM 4000 WIN DX25
- TM 4000 WIN DX2/50E
- TM 4000 WIN SX25 COLOR
- TM 4000 WIN DX2/40 COLOR

IN STOCK
AUTHORIZED DEALER

CALL

COMPAQ CONTURA 486
AUTHORIZED DEALER
- 486SL/25MHz
- VGA Mono Screen
- 120 Meg H.D.
- VGA Color Screen
- 200 Meg H.D.
- IN STOCK

CALL

COMPAQ LTE LITE 486/33
AUTHORIZED DEALER
- 486SL/33MHz
- 120 Meg H.D.
- 4 Meg Ram
- 200 Meg H.D.
- VGA ACTIVE MATRIX COLOR
- IN STOCK

CALL

IBM THINKPAD 350C
- 486SLC/25
- Color Display
- 4 Meg Ram
- 120 Meg H.D.
- VGA Passive Matrix
- 250 Meg H.D.
- 350C

CALL

IBM THINKPAD 750C
- 486SL/20
- 340 Meg H.D.
- 170 Meg H.D.
- Active Color Display
- IN STOCK
- 750

CALL

IBM THINKPAD 500
- 486SL25
- 85 Meg H.D.
- 4 Meg Ram
- 170 Meg H.D.
- 500C
- Mono Display
- IN STOCK

CALL

NEC VERSA
AUTHORIZED DEALER
- 486SL/33MHz
- 120 Meg H.D.
- 4 Meg H.D.
- 180 Meg H.D.
- VGA Color
- IN STOCK

CALL

AST POWER EXEC COLOR
AUTHORIZED DEALER
- 486SL/33MHz
- 4 Meg Ram
- 120 Meg H.D.
- 200 Meg H.D.
- VGA ACTIVE MATRIX COLOR
- IN STOCK

CALL

MACINTOSH
- Powerbook 145
- Powerbook 165C
- Powerbook 180C
- Powerbook 210

• IN STOCK

CALL

HEWLETT PACKARD
AUTHORIZED DEALER

HP4L	$678	HP Scanjet 2C w/int	$1225	HP Fax 310	$1225
HP500	$299	HP Scanjet 2P w/int	$778	HP4M	$1898
HP550C	$678	HP Deskjet Portable	$349	HP4SI	$2898
HP1200C	$1398	HP 100LX w/Meg	$698		
HP4	$1358	HP Omni 300 w/40 Meg	$1699		

Additional toner available at discount prices

All prices include toner

VOLUME DISCOUNTS AVAILABLE!

AUTHORIZED DEALER FOR:

- COMPAQ • APPLE
- ZENITH • AST
- HEWLETT PACKARD
- EPSON • DIGITAL
- TOSHIBA • NEC
- TEXAS INSTRUMENTS

- FACTORY TRAINED SALESPEOPLE
- FULL FACTORY WARRANTY
- FACTORY TRAINED TECHNICIANS
- FULL FACTORY SUPPORT

ASK OUR PROFESSIONALLY TRAINED SALESPEOPLE FOR THE COMPUTER BEST SUITED FOR YOUR NEEDS!

TECH HOURS:
MON-FRI 9-6; SAT 10-4

COMPANY AND GOVERNMENT PURCHASE ORDERS WELCOMED

NO CREDIT CARD SURCHARGE

WE ACCEPT VISA, MASTERCARD, DISCOVER & AMERICAN EXPRESS.

WE ARE OPEN MONDAY-FRIDAY 9:00AM TO 7:00PM est.; SATURDAY 10:00AM TO 6:00PM & SUNDAY 12:00 TO 5:00PM.

1-800-828-2992

FOR TECH SUPPORT AND CUSTOMER SERVICE CALL
(407) 394-3742

FAX YOUR ORDER
(407) 368-3110

LOCAL PHONE NUMBER
(407) 394-4180

22191 POWERLINE RD., SUITE 14B
BOCA RATON, FL 33433

ATTENTION:
Due to On-going Price Reductions of Notebook & Laptop Computers Call for Current Pricing & Availability

THE FOLLOWING ALSO APPLIES:
- ALL ITEMS CARRY A ONE YEAR WARRANTY
- 15-DAY RETURN POLICY
- ALL ITEMS RETURNED MUST INCLUDE ORIGINAL PACKAGING AND DOCUMENTATION
- NO RETURNS WITHOUT RMA NUMBER
- SHIPPING AND HANDLING NON REFUNDABLE
- ALL RETURNS MAY BE SUBJECT TO A RE-STOCKING FEE
- NOT RESPONSIBLE FOR TYPOGRAPHICAL ERRORS

Replace Synth Envy Without Replacing Your Sound Card!

Only $199!

IN THE BEGINNING, WE CREATED THE FIRST 16-BIT WINDOWS SOUND CARD. THEN THE FIRST WAVETABLE SYNTHESIZER FOR WINDOWS MULTIMEDIA. NOW, OUR LATEST FIRST LETS YOU CUSTOMIZE YOUR SYNTHESIZER FOREVER... INTRODUCING TURTLE BEACH MAUI WITH SAMPLESTORE!

You've suffered through the "Heartbreak of FM Synthesis." Now's the time to add Turtle Beach quality to your existing sound card. Maui™ delivers 128 crystal clear wavetable instruments — perfect for multimedia presentations, General MIDI music software, and Windows and DOS games...all for half the price of a Roland, MediaVision, or Creative Labs wavetable sound card.

We've also added SampleStore™ — 256K of sample RAM, so you can take any existing Windows wave file, load it into Maui, and then play it back like any other MIDI instrument. SampleStore is also upgradeable to 8 megs of RAM, which means adding hundreds of your own samples to Maui is a snap. See your favorite dealer, or call 800 554 2184 for more information.

TURTLE BEACH SYSTEMS

All trademarks are registered by their respective companies
Specifications may change without notice

Since 1982

ComputAbility

Consumer Electronics

The MULTIMEDIA SPECIALIST

800-554-9952

PCM 11-93

SPECIAL OFFER!

COMPTON'S NEWMEDIA

Upgrade & Switch

We'll trade an CD encyclopedia for the top-of-the-line Compton's Interative Encyclopedia for only **$79**

CALL FOR DETAILS

for '94

New!

Upgrade Your CD ROM Library

ComputAbility Presents New Competitive & Version Upgrades for Your CD ROM Library!

The New Grolier Multimedia Upgrade

$99

other great upgrades:

Chessmaster 4 MM MPC for Windows	$25
Newsweek Interactive	$25
US Atlas V.4.0 w/America by Air Video for Win.	$25
World Atlas V.4.0 with Video for Windows	$25

SOUND CARDS

CREATIVE LABS, INC. — New!

Sound Blaster 16 Basic	$129
Sound Blaster Deluxe	$75
Sound Blaster Pro Deluxe	$115
Sound Blaster 16 Multi CD	$159
with adv. signal processing	$196
Sound Blaster 16 Scsi 2	$179
with adv. signal processing	$209

MEDIA VISION

Pro Spectrum 16 Basic	$129
Pro Audio Spectrum 16	$155
Pro Audio Studio 16	$199
Pro Audio Studio 16XL NEW	$319

AZTECH LABS, INC.

Sound Galaxy 8Xii	$59
Sound Galaxy NX Pro Extra	$115
Sound Galaxy NX Pro 16	$155

OTHER

Advanced Gravis UltraSound	$129
Turtle Beach MultiSound Free Dnl.	$499
Logitech SoundMan 16	$105
MS Sound System	$175

SPEAKERS

ADVANCED GRAVIS

	LOWER PRICES!
ACS-50	$75
ACS-150	$99
ACS-100	$129
ACS-300	$269

TURTLE BEACH

MAUI

Wavetable Synthesizer Upgrade ~~$199~~ *$159* our price

refer to opposite page for more info

WAVE for Windows

exclusive offer! **$39 ***

*with the purchase of any sound card. Offer good at time of purchase.

TURTLE TOOLS

exclusive offer! **$39 ***

*with the purchase Maui. Offer good at time of purchase.

NEW TITLES!

CD-ROM BONANZA

*Special prices good only at the time of purchase of drive or package.

*Buy any CD-ROM Drive or UpgradeKit Listed in our Ad & Receive CD-ROM Titles at Unbelievable Prices**

$19 ea

- 20th Century Video Almanac for DOS
- Animalia/ SanDiego Zoo for Windows
- Bennett's College Guide MPC
- Bible Library
- Capital Hill MPC
- CD Game Pack II
- Chess Master 4000 MPC
- Interactive Storytime Vol 1
- Mystery Missing CD Deluxe for DOS
- Mavis Beacon 3.0 MPC
- New Basics Electronic Cookbook
- Newsweek Interactive 1 or 2 for DOS
- Oceans Below MPC
- ProPlanet Business Ed DOS
- Space Shuttle MPC
- Sports Best Multilingual - 5 game version
- STAR Presents - Star Wars Chess MPC
- Time Table of Arts & Entertainment
- Time Table of Business & Politics
- Time Table of History Science & Innovation
- US Atlas w/Mapmaker
- US Atlas V.4 with Video MPC
- World Atlas V 4 with Video MPC

$29 ea

- CIA World Fact
- Electronic Home Library
- Great Cities of the World V 1 or 2
- Guiness Book of Records 93 MPC
- International Bus. & Econ. Atlas
- Loom
- Magazine Rack
- Mario is Missing Deluxe
- Mayo Clinic for Window
- Monkey Island
- Publish It!
- Secret Weapons of the Luftwaffe
- Time Magazine Almanac 91
- Toolworks Reference Library
- US History
- Wing Commander/Ultima VI
- World Atlas for Windows MM MPC
- World and US Atlas Pak

$49 ea

- National Geographic Mammals Multimedia Encyclopedia
- Q&A V 4.0
- Toolworks Multimedia Encyclopedia for DOS
- Toolworks Multimedia Encyclopedia for Windows

THE SOFTWARE TOOLWORKS

LOWER PRICES

presents ... **CD ROM MPC Compliant**

LOW COST Upgrade Kits

DRIVE	SOUND CARD (includes all necessary cables)	MPC COMPLIANT KIT	KIT PLUS 7 TITLE BUNDLE
TOSHIBA			
3401 Internal	Pro Audio Spectrum 16*	$559	$649
3401 External	Pro Audio Spectrum 16*	$669	$759
MITUSUMI			
LU005S	Sound Blaster Pro Deluxe	$279	$369
NEC NEW			
NEC Multispin 3Xi	Pro Audio Spectrum 16*	$649	$739
NEC Multispin 3Xe	Pro Audio Spectrum 16*	$749	$839
TEAC NEW			
3028 Int. Double Speed	Pro Audio Spectrum 16*	$539	$629
3028 Ext. Double Speed	Pro Audio Spectrum 16*	$629	$719
CREATIVE			
Omni CD	Sound Blaster S/B 16 Multi CD	$455	$545

** Upgrade to a Pro Audio Studio16 for only $40 additional*

** Upgrade to a Pro Audio Studio 16XL for only $159 additional*

MPC CD ROM SOFTWARE BUNDLE

- Toolworks Multimedia Encyclopedia MPC
- Mavis Beacon Teaches Typing MPC
- Chessmaster 3000 MPC
- Great Cities of the World MPC
- US Atlas MPC
- World Atlas MPC
- San Diego Zoo Presents the Animals MPC

CD ROM DRIVES & BUNDLES

CREATIVE LABS, INC. — New!

Omni CD Internal Double Speed	$295
Digital Edge Multimedia Kit	$629
Discovery/Edutainment	CALL

MEDIA VISION

Pro 16 Multimedia System II, FREE DEL.	$879
Fusion CD 16, Internal / External	$479 / $479
Fusion Double CD 16, *NEW FOR '93!*	$595

NEC

3Xp Professional External	$429
3Xi Internal	$469
3Xi External	$569

TEAC — New!

Double Speed CD ROM Drive

3028 Internal / 5028 External	CALL
8 bit kit with Trantor interface, Int / Ext	CALL
Multimedia Bundle: Internal / External	CALL

TOSHIBA

3401B Double Speed Int / Ext	$389 / $489

TURTLE BEACH

MultiSound MPC Upgrade Kit FREE DEL.	$1,229
MultiSound Multi Bundle FREE DELIVERY.	$699

MITSUMI

CRMC-LU005S, Internal	$169
Internal Upgrade Kit with ATI Sound	$295
Double Speed Internal FX001	CALL

CHINON

535 Double Speed with SCSI II Internal	$349
535 Double Speed with Interface Internal	$385

Quality CD ROM software at a bundle price! Buy one or buy them all! each bundle only $79* *with purchase of any CD ROM drive

Children's Early Learning Bundle

- Mixed Up Mother Goose
- MacMillan's Children Dictionary
- Dinosaur Adventure
- Interactive Storytime Vol. 2

Game Bundle

- King's Quest 5
- PC Sig 12
- Wing Commander and Ultima 6 combo
- Game Pack II

Family Bundle

- National Parks Guide
- Multimedia Encyclopedia for Windows
- Guiness Book of Records 1993

Since 1982
ComputAbility
Consumer Electronics

800-554-9952

PRINTERS

EPSON — Windows Experts Pick — STYLUS 800 $50 Rebate!

Action Laser Printer 1000 512K ... CALL
Action Laser Printer 1500 1MB / 2MB ... CALL
Stylus 800 Ink Jet ... CALL
Stylus 300 Ink Jet - NEW ... CALL
Dot Matrix Printers ... CALL

NEC

Silentwriter M95, 6ppm PS ... $865
M95fx (M95 w/FAX) ... $1079
Silentwriter Superscript 610 NEW ... $619
Silentwriter 1097 ... $1,359

Primera™ Color Printer

High resolution thermal transfer printing
Great for presentations & overheads ... $709

OKIDATA

ML320/ML321 ... $299/$419
590/591 ... $419/$569
395/395C ... $949/$1,019
810/830+ ... $895/$1,079
400e ... $499

star

NX-2420 Rainbow ... $269
NX-2430 8lack ... $215
Star SJ 144 NEW! ... $469
LS-LaserPrinter
5 / 5EX / 5TT ... $679 / $829 / $1049

MODEMS

NEW LOWER PRICES!

ZOOM — Windows Experts Pick

Free Prodigy Starter Kit with purchase of any Zoom Modem!

AMC 2400 Internal with RPI ... $45
AMX 2400 External with RPI ... $49
AFC 2400 Send 96/Rec 48 RPI Int ... $49
AFX 2400 Send 96/Rec 48 RPI Ext ... $59
Zoom/FaxServer Int or Ext ... $205
V 32 bis Send/Receive 14,400 for DDS or Win
Internal / External ... $125 / $155
PKT Portable, 2400 S/R Fax Modem ... $69
Zoom 24/96 with Voice.
VFDI Internal/VFDX External ... $95/$112
Zoom 14.4 PKTExternal ... $225
with Voice ... $265

Supra Corporation

SupraFaxModem Internal 24/96 NEW! ... $53
Supra 240D External ... $59
SupraFaxModem 144LC, Class 1 only
External DDS / Windows ... $155
SupraFaxModem V 32 bis, Internal
with FaxSoftware DDS/Win ... $135
SupraFaxModem V 32 bis, Ext. alone ... $189
with Fax Software, DDS/Win ... $199
with Fax Software Mac ... $215

USRobotics

Sportster 14 4 Int / with Fax ... $155 / $175
Sportster 14.4 Ext. / with Fax ... $175 / $199

CONTROLLERS

Seagate

ST-01 SCSI 8 8it Adaptor ... $29
ST-02 SCSI 8 Bit Adaptor w/FD Control ... $45
ST-08 IDE Controller - HD & Floppy ... $39
ST-11R RLL 8 Bit Controller ... $51

adaptec

1522 SCSI Direction Kit 16 Bit Standard SCSI with Floppy Support & Drivers ... $145
1522 SCSI Direction PLUS Kit ... $199
1542C Single ... $195
1542C SCSI Master Kit / PLUS ... $249/$3D5
2742 Single **NEW** ... $295
2742T Kit **NEW** ... $349
2742T Single **NEW** ... $325
Mini Scsi:
T-358 Plus, T-348 Plus ... $179/$145
T-338 ... $95

FUTURE — Windows Experts Pick — 1680 SVP-ISA

TMC-850 MCD CD RDM Kit ... $55
1680 SVP-ISA, 16 bit SCSI 2 with floppy support & CD RDM SCSI support ... $129
700 EXSVP-EISA ... $369

HARD DRIVES

Seagate

All Seagate Drives Include: Universal Installation Manual, AT Rails & Cable

ST-251-1 MFM ... $239
ST-351A / 3120A IDE ... $109 / $165
ST-3144A / 3243 IDE ... $169 / $199
ST-3550A IDE ... $405
ST-3290A / 3390A IDE ... $225 / $299
ST-3283N SCSI ... $289
FREE DELIVERY:
ST-3550N / 3600N SCSI ... $579/$729
ST-11200N / 11900N SCSI ... $999/$1579
ST-1240N / 12550N SCSI ... $2089/$2339
ST-3655A IDE ... $599

Maxtor®

IDE 7213A / 7245A ... $215 / $229
IDE 7131A / 7345A ... $179 / $309
IDE 540A - FREE DELIVERY ... $779
SCSI 7245 / 7345S ... $259 / $369
SCSI 540SL - FREE DELIVERY ... $849
SCSI 1240S - FREE DELIVERY ... $1199
P1-17S - FREE DELIVERY ... $1199

CONNER The Storage Answer

CP30084 E / CP30174E IDE ... $159 / $179
CP30204 / CP30254 IDE ... $225 / $235
CP30254H / CP30344 IDE ... $225 / $329
CP30544 IDE - FREE DELIVERY ... $625
CP30080E / CP30170E SCSI ... $169 / $195
CP30200 SCSI ... $275
CP30540 SCSI-2 FREE DELIVERY ... $625
CP31370 SCSI-2 FREE DELIVERY ... $1089

Quantum™

ELS 85 IDE / SCSI ... $169 / $189
ELS 127 IDE / SCSI ... $185 / $189
ELS 170 IDE / SCSI ... $195 / $199
LPS 240 IDE / SCSI ... $245 / $249
LPS 525 IDE / SCSI FREE DEL ... $599 / $599
PD 700 SCSI FREE DELIVERY ... $795
PD 1056 SCSI FREE DELIVERY ... $929
PD 1225 SCSI FREE DELIVERY ... $1049

PLUS DEVELOPMENT

Hardcard II XL 50 / 105 ... $199 / $265
Hardcard EZ 42 / 85 ... $185 / $219
Hardcard EZ 127 / 240 ... $255 / $405

MICROPOLIS

FREE DELIVERY(contiguous 48 states)

1528 SCSI / 1548SCSI-2 ... $979 / $1399
1598 / 1624 SCSI-2 ... $979 / $709
1684 SCSI / 19D8-2 ... $1059 / $1729
1924 / 1926 SCSI-2 ... $1889 / $1889
1936 SCSI-2 ... $2449
2105 / 21D8 SCSI-2 ... $799 / $1079
2112 / 2117 SCSI-2 ... $995 / $1459
21D5 / 2112A IDE ... $799 / $995

NETWORKING

ARTISOFT

HARDWARE:
AE-2 Ethernet Starter Kit/Adaptor ... $429/$179
Artisoft Central Station / II ... $365/$379
Node Runner 200DC Starter Kit V.5.0
DDS / Win ... $429 / $489
Node Runner 2000C Adapter ... $159
Node Runner 2000 TP Adapter ... $169
NEW
Node RunnerSI 2D0D/C Thin Ethernet ... $89
5Pack FREE DELIVERY ... $429
Node RunnerSI 2D00/T Twisted Pair ... $89
5Pack FREE DELIVERY ... $429
Node Runne SI 2000/A Combo Ethernet/TP ... $115

SOFTWARE:
LANtastic AI V.5 0 DDS / Windows ... $77 / $89
LANtastic AI Endis ... $135
Articom (serial device sharing) ... $265

3Com

Etherlink II/16 8/16 (3C503-16) ... $155
5 Pack, FREE DELIVERY ... $719
Etherlink III 1D8T ... $129
5 Pack, FREE DELIVERY ... $589
Etherlink III ... $129
5 Pack, FREE DELIVERY ... $589

SMC

EtherCard Elite 16C Ultra - Combo adaptor with RJ-45, 8NC and AUI connectors ... $115
6 pack FREE DELIVERY ... $679
EtherCard Plus Elite 16 Thin Coax ... $115
6 pack FREE DELIVERY ... $619

MONITORS

Panasonic Office Automation

Panasync C1381i, .28 DPm 1024 x 768 ... $299

CTX

5439A, 14", .39DP 1024 768, Inter. ... $235
5468A, 14", .28DP 1024x768, Inter ... $269
5488Ni, 14", 28DP 1024x768,
Non-Interlaced ... $279
1560, 15", 28DP 1028x768, Non Inter ... $445
1760F, 17" Flat, .31DP, 1280x1024,
Non-Glare, Non-interlaced ... $799

SONY

CPD 1320 UC2, 14", 640 x 480 VGA, ... $329
CPD 1430S, 14', 1024 x 768, non-interl,
8514A, 25 MM, cables & stand ... $589
CPD 1730S, 17",1024 x 768, non-interl,
FREE DELIVERY ... $1,039

NEC

SVGA 14" 1024x768 NI, 28 mm dot ... $295
3FGe, 15', 28 1024x768, 60Hz ... $579
5FGe, 17", .28, 1024x768, 76Hz ... $1,045
5FG, 17", .28, 1280x1024, 74Hz ... $1,249
NEW Multi Sync:
3V EnergyStar Compliant ... CALL
4FGe EnergyStar Comp. ... $669
5FGp Dptical Surface ... CALL

SCANNERS

LOGITECH

Scanman 256 (gray scale) ... $169
Scanman 256 with Dmni Page Direct ... $209
Scanman Color ... $415
Scanman Color with Dmni Page Direct ... $429
FotoMan Plus ... CALL

EPSON

ActionScanning System PC ... CALL
ES-800C Bundle ... CALL
ES-800C Professional PC 8undle ... CALL

Mustek

ScanMagic 400 dpi Handheld
256 gs / Color Handheld ... $115 / $229
GrayArtist Handheld, 800 dpi ... $149
PrinScan 1D5, Handheld, 4DD dpi ... $165
ColorArtist Pro Handheld 800 dpi ... $349

TAPE BACK UP

COLORADO™ MEMORY SYSTEMS INC.

JUMBO - Low Cost Tape Backup
DJ10-120MB ... $145
Adaptors. A811 External ... $24
KE10 External ... $79
DJ2D-25DM8 ... $165
Adpators: FC10 Internal ... $62
KE1D External ... $79
JUMBD TRAKKER - External Parallel Printer Port Tape Backup System:
JT10(40-12D) ... $275
JT20 (8D-25D) ... $325
POWERTAPE SYSTEM:
includes Colorado Backup for DDS software
2GB /4G8 Internal/External ... CALL
PowerDAT - Free Delivery
Digital Audio Tape Int/Ext ... $1,495/$1,695

FLOPPY DRIVES

SONY

Floppy Drives
3.5" without Frame 1.44M8 PC/AT ... $55

Canon

All Media Floppy
The All-In-Dne 3 5" & 5.25"
Half Height Internal Floppy Drive ... $ 139

REMOVABLE

SyQuest

BARE DRIVES
511DC, 88M8 Internal ... $389

SOFTWARE

Lotus Smart Pics for Windows ... 72 95
1st ACT! for Windows ... 96 95
386 To The Max 7 0 w/Move Em ... 58 95
ACT! 2.1 for Windows ... 249 95
Adobe Photoshop 2 5 for Windows ... 534 95
After Dark for Windows V 2 0 ... 28 95
Auto Sketch 3 0 for Windows ... 166 95
8ack-It for Windows ... 29 95
8usiness Works 8 0 for Windows ... 479 95
CA Cricket Image for Windows ... 82 95
CA Cricket Paint for Window ... 82 95
CA Cricket Presents for Window 1 4 ... 82 95
CA Realizer for Windows ... 72 95
CA Simply Accounting ... 66 95
Calendar Creator Plus 5 0 for Win ... 39.95
Carbon Copy 2 0 for Windows ... 126 95
Check It Plus ... 77 95
Check It Pro ... 77 95
Claris Works for Windows ... 99 95
Compel 1.0 ... 204.95
Corel Draw 3.0 for Windows ... 129.95
Corel Draw 4.0 for Windows ... 374 95
Corel SCSI Pro ... 319 95
Corel SCSI Software ... 64 95
Crosstalk Mark 4 V2 1 ... 154 95
Design CAD 2D 6 0 ... 163 95
Design Cad 3D 4 0 ... 232 95
Design CAD Expert Series 2 0 ... 529 95
Direct Access 1.0 for Windows ... 62 95
FormTool Gold V 3 0 ... 53.95
Geoworks Pro ... 116 95
Grammatick V for Windows ... 58 95
Hijack Pro 2.0 Windows ... 79 95
Info Select 2 0 ... 79.95
Instant Recall V 2 0 ... 83 95
Kai's Power Tools for Window ... 92.95
Lantastic AI 5 0 for Windows ... 72 95
Lotus 123 3 4 ... 399 95
Lotus 123 Release 4 for Windows ... 299 95
Lotus Drganizer 1 0 for Win ... 91 95
Mac in DDS ... 86.95
Mac In Windows ... 86 95
MS Access 1.1 ... 304 95
MS Fox Pro Distribution Kit ... 318 95
MS FoxPro 2 5 for Windows ... 299 95
MS Dffice for Windows V.3 0 ... 459 95
MS Project 4.0 ... 302 95
MS Publisher 2 0 for Windows ... 86 95
MS Publisher Design Pack ... 33 95
MS Visual Basic 3 0 for Win Prof ... 244 95
MS Visual Basic 3 D for Win Stand ... 124 95
MS Visual C++ Prof for Win 3.5 ... 304 95
MS Visual C++ Stand for Win 3 5 ... 124 95
MS Windows 3 1 ... 88 95
MS Word for Windows V 2.0 ... 299 95
MS Works 2 D Windows ... 122 95
Nebs Dne Write & Accounting ... 76 95
NetRoom V 3 0 ... 59 95
Norton Antivirus V 2.1 DDS & Win ... 82 95
Norton 8ackup 2.0 for Windows ... 94.95
Norton Commander 4 0 ... 62 95
Norton Desktop 2 2 for Windows ... 111 95
Norton Speed Drive 4 D for DDS ... 63 95
Norton Speed Drive 4.0 for Win ... 63 95
Norton Utilities 7.D ... 111 95
Paradox for Windows ... 124.95
PC Anywhere 1 D for Windows ... 124.95
PC Anywhere V.4.5 Host & Remote ... 112 95
PC Globe Maps 'N Facts ... 27.95

PC Tools 1 0 for Windows ... 119 95
Peachtree 2 0 for Windows ... 118 95
Peachtree Complete 7.0 w/DD ... 176 95
Perform Design & Filler for Win ... 128.95
PFS: 1st Choice 4.0 ... 39 95
PFS Resume/Job Search Pro for Win ... 39 95
PFS Windows Works ... 39 95
PhotoShop 2 5 for Windows ... 534 95
Presentation Task Force 4 0 for Win ... 116 95
Print Cache 3 1 ... 42 95
PrintShop Deluxe V 1 2 for Win ... 44.95
Procomm Plus 3 0 for Windows ... 93 95
Q & A Network Pack V 4.0 3 User ... 314 95
Demm 7 ... 57 95
DmodemPro 1 02 ... 58 95
Duark Xpress for Windows ... 544 95
Duattro Pro 5 0 for Windows ... 42 95
Duick 8ooks 2.0 for Windows ... 99 95
Quick 8ooks / Duick Pay 8undle for Win ... 117 95
Duicken 6.0 ... 41 95
Duicken 8usiness Pack ... 53 95
Duicken for Windows ... 39 95
DuickInvoice for Windows 1 0 ... 27 95
Random House Webster's Elect. Dict & Thesaurus ... 59 95
Softerm Modular for Windows ... 149 95
Spanish Assistant 5 0 ... 55 95
Stacker 3.1 ... 91 95
Star Trek Screen Savers for Windows ... 32.95
Symantec C++ for DDS Stand / Pro ... 83 95/314 95
Symantec C++ for Win Stand / Pro ... 83 95/314 95
Turbo C++ Visual 8asic for Windows ... 74 95
Turbo Pascal 7 0 for Windows ... 99 95
Typing Tutur V Plus for Windows ... 29 95
Wave for Windows ... 74 95
WildCat 88S Single Line 3 6 ... 79 95
Windows Draw 3 0w/Ole' ... 47 95
WinFax Pro 3 0 ... 76 95
WordPerfect Add License for Win w/Document ... 202 95
WordPerfect 6 0 DDS ... 284.95
WordPerfect for 5 2 Windows ... 284.95
WordPerfect Works 1 0 ... 92 95

UPGRADES

Ami Pro Windows Version Upgrade ... 59 95
Borland Dffice Win Comp Upgrade ... 354 95
CA Clipper 5 2 Competitive Upgrade ... 139 95
Corel Draw 4 0 Version Upgrade ... 216 95
Harvard Graphics for Windows 2.0 ... 134 95
Lotus 123 Rel 4 Competitive/Vers ... 94 95
Lotus Freelance for Win Comp Upgrade ... 94 95
Lotus SmartSuite for Win Upgrade ... 334 95
MS C++ Visual Version Upgrade ... 134 95
MS DDS 6.0 Upgrade ... 81 95
MS Excel 4 0 for Win. Comp. /Version ... 118 95
MS Dffice for Win. Comp. Upgrade ... 363 95
MS Visual Basic Pro Version Upgrade ... 94 95
MS Visual C++ Std Version Upgrade ... 74.95
MS Windows 3 1 Upgrade ... 49 95
Qemm 7 Upgrade ... 38 95
Duatro Pro for Window Upgrade ... 94 95
Stacker 3 1 Competitive ... 49 95
WordPerfect Comp Tradeup- DOS 6 0 ... 117 95
WordPerfect Comp Tradeup - Win. 5 2 ... 99 95
WordPerfect Version Upgrade - DDS 6 0 ... 99 95
WordPerfect Version Upgrade - Win 5 2 ... 76 95

If You Don't Find What You're Looking for - CALL US!

POWER SUPPLY

TRIPP LITE "THE POWER PEOPLE"

8C Series Standby UPS Systems
BC 25D: 250 VA, 2 outlet ... $95
BC 4DD 4D0 VA, 2 outlet ... $149
8C 500. 5DD VA, 4 outlet ... $179
8C 4D0LAN: 400 VA, 4 outlet, LAN inter ... $149
BC 500LAN 500 VA, 4 outlet, LAN inter ... $189
8C 600LAN 6DDVA, 4 outlet, LAN inter ... $245
8C 75DLAN: 750 VA, 4 outlet, LAN inter ... $299
BC 90DLAN: 900 VA, 4 outlet, LAN inter ... $345
Omnipower Line Interactive UPS
DMNI 450LAN 45D VA ... $249
DMNI 6DDLAN 600 VA ... $295

APC American Power Conversion — LOWER PRICES!

8ack Ups
250 / 4DD ... $99 / $155
450 / 6D0 ... $185 / $255
900 / 125D ... $365 / $489
Smart Ups
370 / 400 ... $309 / $295
600 / 9DD ... $385 / $549
125D ... $739

VIDEO BOARDS

DIAMOND

Speedstar Pro, 1Mb, 24bit, 1280x1D24 ... $115
Stealth 24, ISA / VL8 ... $155/$155
Stealth Pro, ISA, 1M8 / 2MB ... $235/$329
Stealth Pro, VLB 1M8 / 2M8 ... $245/$329
Viper VLB 1MB ... $395

ATI

VGA Wonder GT Windows Accel. ... $165
ATI Graphics plus 1 M8 ... $209
ATI Ultra Pro 2 MB / VLB ... $349 / $349
ATI Ultra Pro EISA 2MB ... $375

NUMBER NINE

9GXE, 123D x 1D24 NI, SVGA
LVL 10, 1MB ... $239
LVL 11, 2MB ... $349
LVL 12, 3 MB ... $429

MICE

Expert Mouse 4 D ... $93
MS Ball Point Mouse 2.0 Portable ... $82

Your #1 Reliable Mail Order Source For Over 10 Years!

HOURS(CST) • Monday through Friday: 8am-8pm • Saturday: 9am-5pm

FLOPTICAL

VALUE STOR
SUPER 21MB External (includes 8 bit host adapter and software $379
VALUE STOR 21MB Internal (includes 3.5" drive, 8 bit SCSI host adapter, cable & software $309

3.5" 2.88MB Floppy
Double the capacity & speed vs. standard 3.5" floppies, reads & writes standard 720K & 1.44MB floppies
Value 2.88MB External ISA $195
Value 2.88MB Internal $219

FOR MORE CD-ROM products
see page 1 of our ad

NEW

NEC presents... Triple Speed CD-ROM Drives

Cutting Edge Technology

Pick the Triple Speed Drive That Fits Your Needs!

- 450 KBytes/Sec Sustained Transfer Rate
- 256 KByte Cache Buffer
- Switchable SCSI1.SCSI2

3Xp Professional External
- 250 MS Access Speed
- Low cost external can be used as a portable

$429

3Xi Internal
- 195 MS Access Speed

$469

3Xi External
- 195 MS Access Speed

$569

Supra Corporation®

SupraFAXModem V.32 bis

Internal DOS or Windows
$135

External DOS or Windows
$199

- 14,400/9600/7200/4800/2400/1200/300 bps data and up to 57,600 bps throughput with another V.42 bis
- 14,400 bps class 1&2 send/receive fax
- compatible w/Group 3 fax machines
- Bell 103/212A & CCITT/V.21/V.22V.22bis/V.32/V.32 bisV.42/V.42bis & MNP 2-5
- 100% compatible with industry-standard "AT" commands & result codes
- extended error correction/data compression "AT" commands & result codes
- Made In the USA

with Alpha Numeric Display

Caller I.D. & Voice Options

NEW LOW PRICES!

EXTERNALS
For use as 14,400 bps modem (no software) $189
DOS with software for use as modem & fax $199
WINDOWS with Windows based fax software $199
MAC with FAXit Software, MicroPhone 1.6, cables, manuals and CompuServe Info Manager $215

INTERNALS
For use as modem & fax with DOS/WINDOWS based fax software $135

SupraFAXModem™ 144 LC

Same specifications as SupraFaxModem V.32 bis but with these exceptions:

- Comes with cable
- Does not come with Alphanumericdisplay
- Class 1 Fax only

includes DOS & Windows software!

External **$155**

ZOOM

FREE Prodigy Starter Kit with purchase of any Zoom Modem!

EXPERTS' Windows PICK

V.32 bis Fax Modem for Windows or DOS

Limited time offer, get WinFax Lite FREE with purchase!

V.32 bis Send/Receive 14,400

Zoom now offers high-speed data and fax with 14,400 bps fax and data. With V 42 bis compression and MNP, these fax/modems can send and receive data at speeds up to 57,600 bps!

Includes award winning Winfax Lite fax software.

Internal $125 **External $155**

Zoom/Voice FaxModem

2400/V.42bis Data, 9600 Fax and Voice. Now voice mail, fax, and error-free 2400 pbs data communications are affordable, convenient, and more powerful than ever. Designed! Voice storage/playback, 2400 bps modem with compression to 9600 bps. Class 1 or 2 send/receive fax with software. V.42 and MNP 5.

VFDI Int. $95 **VFDX Ext. $112**

Zoom/FaxServer with Fax Works LAN

The ideal way to provide fax capabilities for Windows and DOS users on virtually any PC local area network (LAN). Now every authorized users on your LAN can increase their efficiency with the convenience of computerized fax. No more printing documents, walking to the fax machine, preparing cover sheets, or feeding in page after page. It's fast and easy to send any document of any length to anyone, anywhere.

$205

Since 1982
ComputAbility
Consumer Electronics
P.O. Box 17882, Milw, WI 53217

TECH INFO: (414) 357-8181
FAX: (414) 357-7814
HRS (CST): M-F 8am-8pm, Sat 9am-5pm

800-554-9952

- One of Wisconsin's Top 10 Women Owned Businesses.
- Corporate, Government & School POs Welcome.
- VISA MasterCard No Surcharge on Credit Cards.
- Most Orders Shipped within 48 Hours.
- Software Shipping only $5 per order, not per title. Hardware: 5% - Min. $5.
- C.O.D orders welcome, with only a $6.00 Charge.
- We Ship Latest Version of Software Available.
- All Products Sold Carry Manufacturers' Full Warranties & Documentation.
- APO, FPO HI, AK Puerto Rico & Canadian orders welcome: 6% - Min. $6. International Orders Shipped First Class Mail Insured: 15% - Min. $15. If mail cost exceeds calculated amount, you'll be billed additional.
- Call for Free Catalog & Items Not Listed

Personal & company checks allow 14 working days to clear. Prices/Products beyond our control & may change for better or worse. Defective returns must have a Return Authorization number. Call our 1-800# to obtain a Return Authorization or your return will not be accepted. Shipping & handling are non-refundable. All sales are final. All returns are subject to a restocking fee.

WE WILL TRY TO MATCH OR BEAT ANY ADVERTISED PRICE. CALL FOR LATEST PRICING!!

WE ACCEPT PO'S FROM QUALIFIED FIRMS

M E M O R Y

NO SURCHARGE FOR MC, VISA AE & DISCOVER

CACHE MEMORY

	12NS	15NS	20NS	25NS
8Kx8	–	6 50	6 00	5 50
32Kx8	28 00	9 00	8 00	7 00
64Kx1	–	6 50	6.00	5 00
64Kx4	–	11 00	9 00	8 00
16Kx4	–	6 50	6 00	5.00
128Kx8	–	–	49 00	36 00

INTEL 486 DX/SX CPU's

80486	DX2-66	549 00
80486	DX2-50	399 00
80486	DX-50	469 00
80486	DX-33	329 00
80486-	DX-25	269 00
80486	SX-33	189 00
80486-	SX 25	109 00

Individual D-RAM Chips

MEMORY FOR IBM & APPLE

	60NS	70NS	80NS	100NS
1Megx1	7 35	7 25	8 75	4 95
1Megx4	35.00	29 00	27 00	–
1Megx4 (Zip Pack)	25 00	23 00	21 00	–
256 x 4 (Video Zip)	–	–	11 95	10 95
256x4	4.75	4.50	–	–
256 x 1	3.00	2.75	2.50	2 25
256 x 16VRAM	–	39.00	39 00	–
64x4	–	–	3.25	–
64x1	–	–	–	2 00

INTEL Math Chips

8087	45 00
8087-2	49 00
8087-1	85 00
80287-XL	55 00
80387-16 DX	45 00
80387-20 DX	55 00
80387-DX (Does All)	79 00
Intel SX (Does All)	79 00
Intel SL Mobil	85 00
Intel 16SX	49 00
Intel 20SX	54 00

CHANGE YOUR 386 to a 486 (JUST CHANGE CPU)

• Plug Compatible • Cache Software • Uses 387 Math Chip • 50-60% Faster • DOS & WINDOWS Compatible

		Landmark V 2.0
Cyrix 486 DLC 40MHZ	199 00	*130*
33MHZ	179 00	*107 2*
25MHZ	118 00	*A/A*
Cyrix 486 SLC 33MHZ	159 00	*103 5*
25MHZ	128 00	*78 4*
Cyrix 486 DRX2	Call	

SIMM MODULES (Add $5.00 for SIPP)

	40NS	53NS	60NS	70NS	80NS	100NS
1Meg x 9 (3 chip)	65 00	65.00	56 00	54 00	50 00	–
1Meg x 9 (9 chip)	68 00	68 00	65 00	63 00	58 00	44 00
4Meg x 9	–	–	160 00	175 00	179 00	–
16Meg x 9 (9 chip)	–	–	–	909 00	–	–
16Meg x 9 (36 chip)	–	–	–	899 00	–	–

72 PIN SIMMS (EISA)

256 x 36 1Meg		–	–	65 00	59 00	–
512 x 36 2Meg		–	–	95 00	84 00	–
1 x 36 4Meg		–	229 00	219.00	199 00	–
2 x 36 8Meg		–	479 00	459 00	399 00	–
4 x 36 16Meg		–	789 00	769 00	769 00	–
8 x 36 32Meg		–	–	1995 00	1739 00	–
16 x 36 64Meg		–	–	5000 00	–	–

CYRIX FASMATH PROCESSOR

Programs executed up to 3X taster • Plug & object code compat. w/Intel

83D87-40MHz – **89.DD** 83D87-33MHz – **79 DD** 83S87-25SX Ver – **69.00**

83S87-33SX – **89.00** PC Week™ rated #1 over all math chips

5 Year Warranty • "All Downward Compatible"

AST MEMORY MODULES

MODEL	AMT UPGRADED	AST PART #		PRICE
Advantage 12-386	4Meg Kit	500510-004		239 00
8ravo 486	4Meg	500987-002		199 00
	8Meg Kit	500987-003		398.00
	16Meg	500987-004		699 00
Premium 386/25, 16 SX	1Meg	500718-001		59 00
Premium 386/33	1Meg	500718-002		59 00
Premium II	1Meg	500780-003	WPB	59 00
386SX20, 486-25, 25E, 33	4Meg	500780-004	WPB	219 00
Premium Tower, 386/33TE, 486/25TE, 486/33TE	8Meg	500780-001	WPB	438 00
Cupid Memory Board	0-32Meg	500818-001		149 00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #		PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME		59 00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3000MK		195 00
Z386SX	2Meg	Z-605-1	modules	119 00

MAGNAVOX

286/386SX-16, 386SX-20, 486SX-20 & 386-33 *all are 72PIN SIMM*

1MEG – 59 00 4MEG – 195 00 8MEG – 399 00 16MEG – 769 00

MEMORY BOARDS

IBM Compatibles & PS/2

BOCA AT PLUS

USES SIMMS

16 BIT MEMORY 0D. FOR 286, 386 AT • 0K-8Meg Bd 4 0 LIM Compat • New 5 Yr Warr. Convent , Expnd & Extnd Memory • Supports DDS, OS/2, LIM/EMS & EEMS • Versatile Split Memory Addressing • Dperates w/CPU Speeds to 33 MHz • Supports Desqview, Multitask operations • ***Bd. made by Boca Research, AT plus***

DK – $89 00 2Meg – $177.D0 4Meg – $205.DD 8Meg – $441.00

BOCA XT 8 BIT BUS

• Expanded memory for XT • Lim 4 0 compat 0-2Meg • Uses 256x1-100

D-K – **$99 00** 1Meg **$179.00** 2Meg – **$219.00**

IBM P/S2 32BIT EXPANSION BD.

0-32Meg, Ext -Expnd Memory Bd for P/S2 70, 80, 90, Lim 4 0

DMeg	2Meg	4Meg	8Meg	16Meg	32Meg	64Meg
$179 00	$268.00	$374 00	$569 00	$959 00	$1935 00	$3255 00

PS/2 MCA 0-8MEG EXPANSION BD.

0-8Meg Extended and/or Expanded Memory for all IBM P/S2 Models 50, 50Z, 60, 55SX, 65SX, 16 Bit, 4 0 LIM Compat

0K – **119.00** 2Meg – **207.00** 4Meg – **295.DD** 8Meg – **471.00**

USES 1 X 9 SIMMS BOCA BR MC 80

IBM PS/2 SIMM MODULES

IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	37 00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR BD	129 00
33G9288 (2Meg)	Thinkpad 300	129 00
33G9288 (8Meg)	Thinkpad 300	419 00
6450375 (1Meg)	80-041	79 00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	69 00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	189 00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70's, P-70	59 00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	89.00
6450608 (2Meg)	70-A21, A-61, 8-21, B-61, 35SX, 35LS, 40SX Value Point 325T	90 00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	199 00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	199 00
1057035 (512K)	P/S1-286	49.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	109.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	209 00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	95.00
6450128 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Models-2123, 2133, 2155, Value Point 77 486DX2, 486SX, SVR 85	219 00
6450129 (8Meg)	35SX, 40SX	429.00
6450130 (8Meg)	56, 57, 57SX, 90 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	459.00
79F0999 (2Meg)	LX40, N33SX, PS Note	114.00
79F1000 (4Meg)	LX40, N33SX, PS Note	219.00
79F1001 (8Meg)	LX40, N33SX, PS Note	399.00
07G1826 (2Meg)	N51 (all)	109 00
07G1827 (4Meg)	N51 (all)	219.00
07G1828 (8Meg)	N51 (all)	449 00
07G1420 (4Meg)	CL57LSX LpTp, Thinkpad 700, 700C, 720, 720C	249 00
07G1421 (8Meg)	CL57LSX LpTp, Thinkpad 700, 700C, 720, 720C	479.00
92F8804 (2Meg)	N45SL	109.00

COMPAQ MEMORY MODULES

MODEL	AMT UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L,	2Meg Module	115144-001	109.00
486/25, 486/33L,	8Meg Module	116561-001	459 00
486/50L, System Pro	32Meg Module	116568-001	1599 00
DeskPro 386/33L, 486/33L	(Exp Bd)	116569-001	279.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79 00
	4Meg Module	113132-001	229 00
DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	149.00
	4Meg Exp Bd	113634-001	309 00
	1Meg Module	113646-001	79 00
	4Meg Module	112534-001	229.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149 00
DeskPro 386/25E	4Meg Exp Bd	113645-001	299 00
	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	229 00
DeskPro 286N, 386N,	1Meg Module	118688-001	59 00
386SX/20, 386/25M, 486/33M,	2Meg Module	118689-001	89.00
486S/25M, 486S/16M	4Meg Module	118690-001	195 00
Port 486C	8Meg Module	128877-001	429 00
M Series Exp Bd	0-64Meg	129160-001	279 00
DeskPro 386/16	1Meg Kit	108071-001	99 00
	4Meg Kit	108072-001	299 00
	1-2Meg Exp Bd	108069-001	239.00
	4-0Meg Exp Bd	108070-001	399 00
DeskPro 286	512K Kit	113012-001	49 00
Prolinea 386 3/25S, 3/252S	2Meg	141738-001	109 00
	8Meg	141742-001	320 00
Prolinea 486 4/25S, 4/33, 4/50, 4/66, CDS	2Meg	141683-001	95 00
	4Meg	141684-001	219 00
	8Meg	141685-001	459 00
Prosignia PC Server, 486/33,	8Meg	141685-001	459 00
486 DSX/66	16Meg	149320-001	786 00
	32Meg	149147-001	1749 00

COMPAQ LAPTOPS & NOTEBOOKS

LTE/286	2Meg Bd	117081-002	99 00
LTE/286	4Meg Bd	117081-003	204 00
LTE/386S/20	4Meg Module	121125-002	249 00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	249 00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	419 00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	829 00
LTE LITE 4/25C	4Meg Module	142337-002	229 00
LTE LITE 4/25C	8Meg Module	142337-003	499 00
LTE LITE 4/25C	16Meg Module	142337-004	789 00
SLT/286	1Meg Module	110235-001	75 00
SLT/286	4Meg Module	110237-001	315 00
SLT/386	1Meg Module	118303-001	79 00
SLT/386	2Meg Module	118304-001	109 00
SLT/386	4Meg Module	118305-001	229 00
Contura 320, 325	2Meg	139497-001	109 00
	4Meg	139498-001	209 00
	8Meg	139499-001	419 00
Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	95 00
	8Meg	146521-001	419 00
	16Meg	146531-001	049 00

PCMCIA VERSIC (for Palmtop & Subnotebooks)

MODEL	PRICE	MODEL	PRICE
S-RAM Cards 1MEG	179 00	14,400/14,400 Data/Fax Modems	349 00
S-RAM Cards 2MEG	209 00	9600/9600 Data/Fax Modems	319 00
Card Pro (made by Data I/O) Transfers data from PCMCIA card to desktop PC, connects to a parallel port	319 00	2400/9600 Data/Fax Modems	199 00
		Lan Ethernet (10 Base T)	229 00
		Visual Media (CD Rom, Tape Drive)	279 00

NO SURCHARGE FOR MASTERCARD, AMEX VISA OR DISCOVER PURCHASE ORDERS ACCEPTED FROM FOR TUNE 2000 GOVERNMENT & INSTITUTIONS California orders add 8 25%sales tax. Returned orders or ordered wrong parts are subject to a 20% restocking fee (Memory chips not installed in boards) We accept International orders shipped via UPS Air APO FPD orders welcome Customers are expected to pay customs and "other" charges if shipped Int'l All credit card charges verified for fraudulent use SORRY NO REFUNDS AFTER 30 DAYS – EXCHANGES ONLY We accept MC VISA Discover AE prepaid orders purchase orders wire transfer COD (cashiers check) orders, cash & cashiers checks Orders shipped by UPS FEDX must be signed for • ALL MANFACTURER PART #'S ARE FOR REFERENCE ONLY • MINIMUM DRDER $40 00

Price and availability subject to change without notice

All products Brand new & guaranteed • We buy excess inventory

Trademarks are registered with their respective companies.

L.A. TRADE

22825 Lockness Avenue • Torrance, CA 90501

TOSHIBA LAPTOP MEMORY

MODEL	AMT UPGRADED	MANU PART #	PRICE
T1000SE/XE/LE	2Meg	PC14-PA8312U	85 00
T2000/T2000SX	2Meg	PC18-PA8317U	85 00
T2000SX/T1000LE	4Meg	PC-PA8314U	229 00
T2000SX/T1000LE	8Meg	PC14-PA8315U	429 00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	85 00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	229 00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	429 00
T4400SX, SXC T6400	4Meg	PC-PA2004U	231 00
T4400SX, SXC T6400	0Meg	PC-PA2005U	463 00
T4400SX, SXC T6400	16Meg	PC-PA2010U	729 00
T4400SX, SXC,T6400	32Meg	N/A	2999 00
T4500, T4500C, T4600, T1900, T1900C (3 3 v)	4Meg	PC-PA2012U	259 00
T4500, T4500C, T4600, T1900, T1900C (3 3 v)	8Meg	PC-PA2013U	494 00
T4500, T4500C, T4600, T1900, T1900C (3 3 v)	16Meg	PC-PA2014U	1349 00
T4500, T4500C, T4600, T1900, T1900C (3 3 v)	32Meg	N/A	3299 00
T3300SL	4Meg	PC-PA2007U	234 00
T3300SL	6Meg	PC-PA2008U	349 00
T3300SL	0Meg	N/A	489 00
T3300SL	16Meg	PC-PA2009U	719 00
T1200XE	2Meg	PC13-PA8306	104 00
T1600	2Meg	PC8-PA8302U	104 00
T3100	2Meg	PC3-PA7135E	179 00
T3100e	2Meg	PC9-PA834DU	129 00
T3100SX	2Meg	PC15-PA8308U	104 00
T3100SX	4Meg	PC15-PA8310U	209 00
T3200	3Meg	PC6-PA7137U	185 00
T3200SX	2Meg	PC12-PA8307U	129 00
T3200SX	4Meg	PC12-PA8909	224 00
T3200SXC	2Meg	PC19-PA8318U	99 00
T3200SXC	4Meg	PC19-PA8319U	234 00
T5100	2Meg	PC7-PA8301U	95 00
T5200/T8500	2Meg	PC10-PA8304U	114 00
T5200/T8500	8Meg	PC10-PA8313U	459 00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU PART #	PRICE
ALR Venture	4Meg	12407980	279 00
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	209 00
AST Power Exec 3/25C, 425EL	4Meg		229 00
AST Power Exec 3/25C, 425EL	16Meg		1049 00
AST Power Exec 425SL	4Meg		239 00
AST Power Exec 425SL	16Meg		1099 00
AT&T Safari NSX/20	4Meg	PEC 37651	299 00
Bondwell 8310, Plus	1Meg	23050-09100	109 00
Bondwell B310V, SX	1Meg		109 00
Bondwell B310V, SX	4Meg		229 00
Epson NB3	4Meg	A808511	219 00
Epson NB/SL 20,25,25C	2Meg	A808771	119 00
	4Meg	A808781	219 00
	8Meg		479 00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	109 00
Everex Tempo Carrier	2Meg	PWA 0864-A-J000	119 00
Goldstar GS520 386SX/16	4Meg	S386-4M	299 00
Leading Edge D/LT 386SX	1Meg		94 00
Magnavox Metalis	1Meg, 4Meg	286, 386SX	119 00,219 00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	79 00
NEC Prospeed 286, 386SX-10	4Meg	PC21-22	219 00
NEC Prospeed 386	2Meg	PC31-21	119 00
NEC Prospeed 386	8Meg	PC31-22	439 00
NEC Prospeed 306SX-20	1Meg	PC43-21	79 00
NEC Prospeed 386SX-20	4Meg	PC43-22	219 00
NEC Ultralite III/20, 20P, 25C	2Meg	PC47-21	119 00
NEC Ultralite III/SL/25C	4Meg	PC47-22	219 00
NEC Ultralite SL/20, 20P	6Meg	PC49-21	319 00
NEC Ultralite III/25C	8Meg	PC47-23	439 00
NEC Ultralite Versa	4 Meg/8Meg/16Meg		299/499/1799
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	119 00,219 00
Panasonic CF170, CF270, CF370	1Meg	CF-8A165	49 00
Sanyo 17/18 NB	2Meg	MBC-NBMEM2	109 00
Sharp 6781, 6881, 6705	2Meg/4Meg		119 00/229 00
Sharp PC-6220	1Meg	CE 621B	79 00
Tandon, PC Brand, Dataworld	2Meg, 8Meg	N8386SX-20	129 00, 449 00
TI Travelmate 2000	1Meg	2568034-0001	79 00
TI Travelmate 3000	2Meg	2566996-1	04 00
TI 4000	4Meg, 16Meg		219 00, CALL
Twinhead, Altima, Compudyne Tandy 4860, 486SX, DX	4Meg/16Meg		219 00/999 00
Zeos 386SX Notebook	2Meg		109 00
Zenith Master Sport 386SX	2Meg	ZA-300-1	109 00
Zenith Master Sport SL, SLE	2Meg	ZA-4-4	109 00
Zenith Super Sport 286, 286E	1Meg	ZA-180-66	99 00
286E, SX	2Meg	ZA-180-64	179 00
SX Alpha	2Meg	ZA-180-86	179 00
SX Beta	2Meg	ZA-180-87	179 00
Zenith Z-Note 325L, LC	2Meg/8Meg	ZA3250-4/-5	129 00/419 00

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	0K Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Canon LBP4, 4Lite, 4plus	–	–	159	219	–	–	–	–	–	–	–	–
Canon LBP-4SX	–	–	call	call	–	–	–	–	–	–	–	–
Compaq Pagemarq	–	–	–	99	–	–	195	–	–	389	–	–
Epson 6000, Action Laser	–	–	–	125	–	–	209	–	–	–	–	–
Epson Action Laser II	–	–	89	–	199	–	–	305	–	–	–	–
Epson 8000	–	–	89	–	199	–	–	305	–	–	–	–
Epson 1000	–	–	–	108	–	–	216	–	324	–	–	–
HP 2, 2D–	–	–	–	119	–	–	199	–	–	–	–	–
HP 3, 3D, 3P, 2P 2P+	–	–	–	109	–	–	189	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	09	–	–	195	–	–	399	–	–
HP 4L	–	–	59	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	69	–	–	–	199	–	–	399	–	–
HP 4SI	–	–	–	69	–	–	199	–	–	399	–	–
HP Deskjet 500, 500C, 550	–	59	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	09	–	–	199	–	–	399	–	–
HP Paintjet XL300	109	–	–	–	–	–	304	–	–	499	907	–
IBM Laser 4019, 4019E	–	–	–	–	–	169	–	–	–	–	–	–
IBM Laser 4029	–	–	–	–	–	–	199	–	–	–	–	–
IBM Laser 4039	–	–	–	99	–	–	199	–	–	389	–	–
NEC 90, 290	–	–	–	139	–	–	–	–	–	–	–	–
NEC 95	–	–	–	99	–	–	–	–	–	–	–	–
Dki 400	–	–	–	95	–	–	–	–	–	–	–	–
Dki 400 8	–	–	135	109	–	–	–	–	–	–	–	–
Dki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
Packard Bell PB 9500	–	–	–	124	–	–	209	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	129	–	–	209	–	–	–	–	–
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–	–
Panasonic 4450	–	–	99	–	–	–	–	–	–	–	–	–
TI XL/PS17/PS35	–	–	55	–	–	–	–	–	–	–	–	–

H.P. COMPATIBLE FONT CARTRIDGE

BAR CODES Bar Code Reader Fonts	99 00
DESKJET SOLUTION for DkJt 500 & Plus, 92 Fonts, 4 5 pt-30 pt	99 00
IBM 4D19, 4D19E, FONT CARTRIDGE 209 Fonts, Turbo Card	105 00
TURBO 25 Comparable to Pacific Data's 25 CARTRIDGES IN ONE!™, 143 Fonts *(compat with Epson Action Laser II and all HP Printers except HP4)*	79 00
TURBOSCRIPT™ 47 Scalable Fonts in Any Point Size (HP 2, 2D – 159)	149 00
TURBOSCRIPT™ 109 109 Scalable Fonts to Any Point Size (HP 2, 2D – 199)	179 00
TAX & FINANCE FOR IOM 4019, 4019E, 4029	139 00
TAX & FINANCE CARTRIDGE	64 00
OKI 4D0, 000 41 fonts, 11 typestyles	169 00

310-539-0019
FAX: 310-539-5844

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

CALL TOLL FREE **1-800-433-3726** (US and Canada)

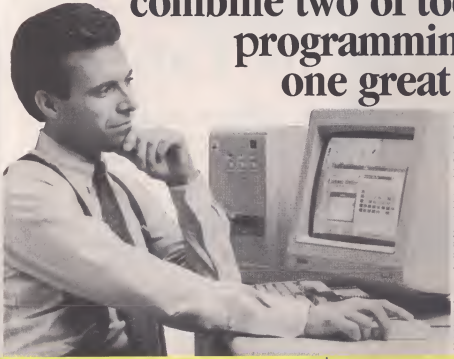
ESTAB. 1985

Mon-Fri, 8:00 a.m. to 5:00 p.m. PST
Sat. 10:00 a.m. to 12:00 noon

PRICES MAY FLUCTUATE. CALL FOR LATEST PRICING!!

Train With and Keep a Powerful 486sx/25 MHz Mini-Tower Computer!

NRI's new training in Programming in C++ with Windows lets you combine two of today's hottest programming skills into one great new career!



work with the top-rated Borland Turbo C++ compiler included in your course, you master object-oriented programming methods — gaining the practical experience and design expertise that will save you time and make future programming fast and easy.

You discover for yourself how this in-demand language allows you the freedom to write real-world applications that rival software produced by top-paid design teams — from stand-alone graphics and word processing packages to spreadsheets, text editors, database managers, and more! But that's still not all...

Learn to program for the exciting visual environment of Microsoft® Windows™

With NRI training you take command of today's newest design techniques as you master programming skills for Windows — using both C++ and the built-in functions and routines of

Rush this postage-paid card for your free catalog!

Every NRI course features practical, hands-on training with state-of-the-art equipment you keep. Only NRI gives you the training *and* the equipment for career advancement, part-time earnings, or even a business of your own.

Check One ☑

Please send my free catalog on NRI training in:

- ☐ **Computer Programming**
- ☐ Microcomputer Servicing
- ☐ PC Applications Specialist
- ☐ Programming in C++ with Windows
- ☐ Desktop Publishing & Design
- ☐ Word Processing Home Business
- ☐ TV/Video/Audio Servicing
- ☐ Telecommunications
- ☐ Industrial Electronics & Robotics
- ☐ Electronic Music Technology
- ☐ Radio Communications
- ☐ Basic Electronics
- ☐ Computer-Aided Drafting
- ☐ Building Construction
- ☐ Home Inspection
- ☐ Air Conditioning, Heating & Refrigeration
- ☐ Electrician
- ☐ Automotive Servicing
- ☐ Paralegal
- ☐ Fiction/Nonfiction Writing
- ☐ Writing Children's Literature
- ☐ Interior Design
- ☐ Bookkeeping and Accounting

For career courses approved under G.I. Bill, ☐ check for details.

Name (Please print) Age

Street (No P.O. Box numbers please) Phone

City State Zip

Accredited Member National Home Study Council

4541-1193

Rush this postage-paid card for your free catalog!

Every NRI course features practical, hands-on training with state-of-the-art equipment you keep. Only NRI gives you the training *and* the equipment for career advancement, part-time earnings, or even a business of your own.

Check One ☑

Please send my free catalog on NRI training in:

- ☐ **Computer Programming**
- ☐ Microcomputer Servicing
- ☐ PC Applications Specialist
- ☐ Programming in C++ with Windows
- ☐ Desktop Publishing & Design
- ☐ Word Processing Home Business
- ☐ TV/Video/Audio Servicing
- ☐ Telecommunications
- ☐ Industrial Electronics & Robotics
- ☐ Electronic Music Technology
- ☐ Radio Communications
- ☐ Basic Electronics
- ☐ Computer-Aided Drafting
- ☐ Building Construction
- ☐ Home Inspection
- ☐ Air Conditioning, Heating & Refrigeration
- ☐ Electrician
- ☐ Automotive Servicing
- ☐ Paralegal
- ☐ Fiction/Nonfiction Writing
- ☐ Writing Children's Literature
- ☐ Interior Design
- ☐ Bookkeeping and Accounting

For career courses approved under G.I. Bill, ☐ check for details.

Name (Please print) Age

Street (No P.O. Box numbers please) Phone

City State Zip

Accredited Member National Home Study Council

4541-1193

WE WILL TRY TO MATCH OR BEAT ANY ADVERTISED PRICE. CALL FOR LATEST PRICING!!

WE ACCEPT PO'S FROM QUALIFIED FIRMS

MEMORY

NO SURCHARGE FOR MC, VISA AE & DISCOVER

CACHE MEMORY

	12NS	15NS	20NS	25NS
8K×8	–	6.50	6.00	5.50
32K×8	28.00	9.00	8.00	7.00
64K×1	–	6.50	6.00	5.00
64K×4	–	11.00	9.00	8.00
16K×4	–	6.50	6.00	5.00
128K×8	–	49.00	38.00	

Individual D-RAM Chips

MEMORY FOR IBM & APPLE

	80NS	70NS	100NS	150NS
16Kx1	4.00	3.50	2.50	–
16Kx4	20.00	20.00	21.00	–
16Kx8	25.00	23.00	21.00	–
128 (16K)				
64Kx1	–	11.95	10.95	
512(64 Cpc)				
256x4	4.75	4.50	–	–
256 x 1	2.50	2.50	2.25	2.25
256 x 1 (64RAM-)	39.00	39.00	–	–
64x4	–	3.50	–	–
64x1	–	2.50	2.00	–

INTEL 486 DX/SX CPU's

80486	DX2-66	949.00
80486	DX2-50	399.00
80486	DX-50	459.00
80486	DX-33	359.00
80486	DX-25	269.00
80486	SX-33	189.00
80486	SX-25	129.00

INTEL Math Chips

8087	42.00
80287	149.00
80871-1	85.00
80287-10	149.00
80387-16 DX	45.00
80387-25 DX	55.00
80387-33 (Wkrs Alt)	79.00
Weitek 3167-20 (40)	149.00
Intel SX Model	65.00
Intel 16SX	48.00
Intel 20SX	54.00

CHANGE YOUR 386 to a 486 (JUST CHANGE CPU)

• Plug Compatible • Cache Software • Uses 387 Math Chip
• 50-60% Faster • DOS & Windows Compatible

	Lowtech V 2.0
Cyrix 486 DLC 40MHZ	199.00
33MHZ	179.00
25MHZ	116.00
Cyrix 486 SLC 33MHZ	119.00
25MHZ	109.00
Cyrix 486 DRX2	Call

SIMM MODULES (Add $5.00 for SIPP)

	30PIN	32PIN	30PIN	72PIN	72PIN
1Meg x 9 (8 chip)	39.00	39.00	34.00	52.00	
4Meg x 9 (8 chip)	68.00	68.00	63.00	79.00	149.00
16Meg x 9 (8 chips)	–	–	159.00	179.00	–
16Meg x 9 (36 chips)				899.00	

72 PIN SIMMS (EISA)

256 x 36 1Meg	–	–	59.00	59.00
512 x 36 2Meg	–	–	109.00	109.00
1 x 36 4Meg	–	229.00	219.00	199.00
2 x 36 8Meg	–	479.00	449.00	399.00
4 x 36 16Meg	–	789.00	749.00	739.00
8 x 36 32Meg	–	–	1499.00	–
16 x 36 64Meg	–	–	3999.00	–

CYRIX FASMATH PROCESSOR

IBM PS/2 SIMM MODULES

IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	37.00
30F5900 (2Meg)	30-286, 25-286, 50 MTHR BD	129.00
33G9289 (2Meg)	Thinkpad 300	129.00
33G9290 (4Meg)	Thinkpad 300	419.00
64F9773 (1Meg)	55SX	79.00
64F9776 (2Meg)	30-111, 191-191, 1F0 , 0B1, 1B1	129.00
64F3480 (4Meg)	80-A21, A41, B21, B41, 9121, 9141	189.00
64F9063 (1Meg)	35SX, 40SX, 55SX, Model-170, P-70	69.00
64F9064 (2Meg)	35SX, 40SX, 55SX, 56SX, 65SLC, P-70,	89.00
	65LS, 65LS, P-Series, 190 A, 195, 395A, 3bxA, 40SX,	
64F9068 (2Meg)	70-A21, A41, B21, B41, 333X, 33C3, 43B3	90.00
	Value Point 325T	
76H8935 (128K)	25	26.00
34F3933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	159.00
34F3934 (8Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	199.00
107F8325 (512K)	P-70, 386, 386SX	49.00
107F8333 (2Meg)	P-70 & P-75/386SX-2121	149.00
107F8344 (4Meg)	P-70 & P-75/386SX, Model-2121	269.00
64G9062 (2Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	99.00
	Value Point 77 486/DX2, 486SX, DVR 85	
64G9128 (4Meg)	57SX, 90, 95, P-75, 57SLC, 58, 58SLC	219.00
	P-75, 386SX, Model-2123, 2133, 2183,	
	Value Point 77 486/DX2, 486SX, DVR 85	
64G9129 (8Meg)	35SX, 40SX	429.00
64G9130 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	459.00
	Value Point 77 486/DX2, 486SX, DVR 85	
79F0999 (2Meg)	L40, M30-X, PS, Note	114.00
79F1000 (4Meg)	L40, M30-X, PS, Note	179.00
79F1001 (8Meg)	L40, M30-X, PS, Note	349.00
07G1829 (2Meg)	N33 (sif)	139.00
07G1827 (4Meg)	N51 (sif)	219.00
07G1828 (8Meg)	N51 (sif)	449.00
07G1425 (4Meg)	CL51,CL6 Laptop, Thinkpad 700, 700C, 720, 720C	479.00
07G1421 (8Meg)	CL51,CL6 Laptop, Thinkpad 700, 700C, 720C	479.00
07F8804 (2Meg)	N40SX	109.00

COMPAQ MEMORY MODULES

MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L,	2Meg Module	115164-001	109.00
486/25, 486/25L,	8Meg Module	115641-001	459.00
486/50L, System Pro	32Meg Module	115500-003	1599.00
DeskPro 386/25L, 486/66L	2Meg Module	115166-001	179.00
DeskPro 386/25, 386/20	2Meg Module	115139-001	79.00
	8Meg Module	115140-001	349.00
DeskPro 386/5-16MHz	1Meg Exp Bd	115625-001	149.00
	4Meg Exp Bd	115626-001	319.00
	8Meg Exp Bd	115627-001	79.00
	4Meg Module	115264-001	229.00
DeskPro 386/20E	1Meg Exp Bd	115364-001	149.00
DeskPro 386/25E	4Meg Exp Bd	115645-001	299.00
	8Meg Module	115131-001	79.00
DeskPro 286N, 386N	4Meg Module	115132-001	229.00
386SX/20, 386/25M, 486/33M,	2Meg Module	115668-001	59.00
486/25M, 486/33M, 486/66M	8Meg Module	115669-001	189.00
Prem 486M	8Meg Module	115670-001	229.00
M Series Exp Bd	1Meg Kit	128977-001	79.00
DeskPro 386/16	1Meg Kit	128977-001	79.00
	4Meg Kit	128972-001	239.00
	1-2Meg Exp Bd	100369-001	239.00
	4-8Meg Exp Bd	100370-001	399.00
DeskPro 286	512K Kit	113012-001	49.00
Prolinea 386/33S2, 12/125	2Meg	141798-001	109.00

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
T1000/SE/XE/LX	2Meg	PC14-PA3312U	85.00
T2000/T3200/SX	2Meg	PC16-PA3317U	85.00
T2000SX/T1000LE	4Meg	PC-PA3140	239.00
T2000/T3200/SX	2Meg	PC14-PA3313U	85.00
T8000/T4900/T2000/SX,T1600,1850,LE	2Meg	PC-PA3000U	85.00
T7000/T5200/T3100/SX,T1600,1850,LE	2Meg	PC-PA3001U	229.00
T2000/SX/T3200/SX,T1600,1850,LE	8Meg	PC-PA3302U	429.00
T4400SX, SXC, SXC2	4Meg	JPC-PA3001U	231.00
T4400SX,C,SXC,T4400	8Meg	PC-PA3003U	463.00
T4400SX,C,SXC,T4400	16Meg	PC-PA3004U	929.00
T4400SX, C,SXC,T3400	SIMM	N/A	2299.00
T4500, T4500C, T4600, T1900, T1900C (3.3 V)	2Meg	PC-PA3012U	259.00
T4500, T4500C, T4600, T1900, T1900C (3.3 V)	4Meg	PC-PA3013U	494.00
T4500, T4500C, T4600, T1900, T1900C (3.3 V)	16Meg	PC-PA3014U	1349.00
T4500, T4500C, T4600, T1900, T1900C (3.3 V)	SIMM	N/A	2299.00
T3100SFL	4Meg	PC-PA3007U	234.00
T3100SFL	8Meg	PC-PA3008U	349.00
T3100SFL	16Meg	N/A	499.00
T3100SFL	2Meg	PC-PA3006U	119.00
T3100SXC	2Meg	PC13-PA3598	104.00
T1600	2Meg	PC8-PA3531	104.00
T3100	2Meg	PC3-PA1335	179.00
T3100SX	2Meg	PC8-PA3540U	139.00
T3100SX	4Meg	PC15-PA3508U	104.00
T3200SX	4Meg	PC15-PA3510U	259.00
T3200SX	8Meg	PC15-PA1337U	185.00
T3200SXC	2Meg	PC13-PA3599	139.00
T3200SXC	4Meg	PC13-PA3600	239.00
T3200SXC	8Meg	PC13-PA3601U	86.00
T3200SXC	16Meg	PC13-PA3616U	534.00
T3100	2Meg	PC7-PA3511U	95.00
T3200/T8500	2Meg	PC17-PA3534U	114.00
T3200/T8500	8Meg	PC10-PA3131U	459.00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ALR Motivator	4Meg	01B0780	179.00
AST Notebook Prem Exec	4MeG	5008104-003	339.00
AST Ultra Exec 3025C,			
AST Power Exec 3025C, 4236L	4Meg		209.00
AST Power Exec 3025C, 4236L	16Meg		1049.00
AST Power Exec 4033L	2Meg		109.00
AST Power Exec 4033L	16Meg		1099.00
AT&T Global Info NX486	4Meg	PIC 37561	399.00
Bondwell B-290	2Meg	23055-08700	109.00
Bondwell B-290	4Meg		179.00
Compaq LTE/Elite 386	4Meg		229.00
Epson NB3	4Meg	A808511	219.00
Epson NB3, 33,25,25C	4Meg	A808701	119.00
	4Meg	A808181	219.00
Everex Tempo LX, LX20	2Meg		109.00
Everex Tempo Carrier	2Meg	PCA 600C5-2M	109.00
Everex Tempo STEP 386SX/16	2Meg	PCA 600C5-2M	109.00
Leading Edge DL/ 386SX	1Meg		54.00
Magnavox Model	2Meg	286, 286SX	119.00 2 PIN
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	79.00
NEC Prospeed 286, 386SX-16	2Meg	PC21-22	119.00
NEC Prospeed 286	4Meg	PC21-23	179.00
NEC Prospeed 286	8MeG	PC21-27	429.00
NEC Prospeed 386SX-20	2Meg	PC21-24	179.00
NEC Prospeed 386 SX-20	4Meg	PC21-22	219.00
NEC Ultralite 1400, 286F,25C	2Meg	PC21-21	119.00
NEC Ultralite 1400,25C	4Meg	PC21-22	219.00
NEC Ultralite 3C,3D, 286	8Meg	PC21-27	319.00

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

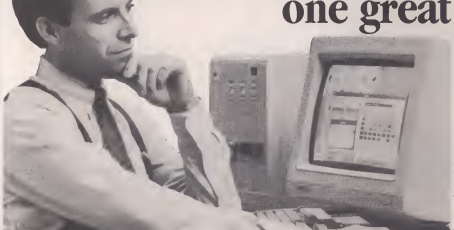
BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 10008 WASHINGTON, D.C.
POSTAGE WILL BE PAID BE ADDRESSEE
NRI Schools
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20078-3543

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 10008 WASHINGTON, D.C.
POSTAGE WILL BE PAID BE ADDRESSEE
NRI Schools
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20078-3543

Train With and Keep a Powerful 486sx/25 MHz Mini-Tower Computer!

NRI's new training in Programming in C++ with Windows lets you combine two of today's hottest programming skills into one great new career!



Like never before, organizations everywhere are paying top dollar for PC programmers who can combine the power of object-oriented C++ with the new freedom and ease of Windows to create in-demand software for business, industry, or consumer applications.

Pick up the classified section in any major newspaper and you'll see: C++ programming and the ability to create PC programs for a Windows environment top the list of job skills today's employers demand.

Now you can take advantage of today's hottest programming opportunities with NRI's new at-home training — Programming in C++ with Windows. It's the right training at the right time. And the only training that gives you everything you need to succeed today on the job, in a new career, or in a full- or part-time programming business of your own.

Get hands-on training with a 486sx-based mini-tower computer system

NRI knows: To program in C++ and create Windows applications, you need to work with a state-of-the-art computer system. That's why NRI gives you hands-on experience with a 486sx/25 MHz mini-tower computer — the most powerful computer system available in home study today. You train with and keep this state-of-the-art system, complete with VGA color monitor, enhanced keyboard and mouse, an 80 meg hard drive, and five full megabytes of RAM.

This outstanding computer system gives you the memory, speed, and power you need to take advantage of all the features of your C++ compiler and Windows software ... and develop the kind of quality software programs today's employers and consumers demand. But hardware is just part of what makes NRI training so good ...

Get practical experience with a powerful 486sx-based computer, VGA color monitor, 5 meg RAM, 80 meg hard drive, enhanced keyboard and mouse, and professional software...all yours to train with and keep!

Master object-oriented programming using Borland Turbo C++®

With NRI you learn at home, at a comfortable pace. NRI's Discovery Learning Method takes you step-by-step from computer basics to advanced programming in C++, today's hottest object-oriented programming language. As you work with the top-rated Borland Turbo C++ compiler included in your course, you master object-oriented programming methods — gaining the practical experience and design expertise that will save you time and make future programming fast and easy.

You discover for yourself how this in-demand language allows you the freedom to write real-world applications that rival software produced by top-paid design teams — from stand-alone graphics and word processing packages to spreadsheets, text editors, database managers, and more! But that's still not all...

Learn to program for the exciting visual environment of Microsoft® Windows™

With NRI training you take command of today's newest design techniques as you master programming skills for Windows — using both C++ and the built-in functions and routines of your Microsoft Windows software.

As you actually build your own software application, you develop hands-on experience with Windows' easy-to-use features —including graphics, memory management, multitasking, data exchange, and more!

Soon you're ready to use your computer and know-how to create fast, functional programs — complete with on-screen graphics, custom cursors, images, icons, and all the other Windows features you need to build high-performance software that meets today's competitive business needs.

Send for your FREE NRI catalog today!

Discover how NRI can give you the computer know-how you need for success. If the coupon is missing, write to NRI Schools, McGraw-Hill Continuing Education Center, 4401 Connecticut Avenue, NW, Washington, DC 20008.

SEND COUPON TODAY FOR FREE NRI CATALOG!

NRI Schools McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW, Washington, DC 20008

Yes! Send me the FREE catalog I've checked and show me how NRI can give me the state-of-the-art computer training I need for advancement, extra income, or a business of my own!

Check one FREE catalog only
- ❑ **PROGRAMMING IN C++ WITH WINDOWS**
- ❑ PC Troubleshooter
- ❑ PC Applications Specialist

Other computer career training:
- ❑ Computer Programming
- ❑ Desktop Publishing and Design
- ❑ Bookkeeping and Accounting

Name_____ Age_____

Address_____

City_____ State_____ Zip_____

Accredited Member, National Home Study Council 4541-1193

With Prices This Low, By The Time You Read This, It May Be Too Late.

As recently as September of 1993, these Texas Instruments printers were winning major awards. Today, we're selling them at incredibly low prices*. And tomorrow, we just may be sold out.

TI microLaser Plus ~~$999~~ $669

TI microLaser Plus PS17 ~~$1199~~ $765

TI microLaser Plus PS35 ~~$1349~~ $810

TI microLaser Turbo ~~$1599~~ $1068

microLaser™ Plus	microLaser PS17	microLaser PS35	microLaser Turbo
Entry Level Windows Solution	Affordable PostScript® Solutions	Affordable PostScript Solutions	PostScript for the Power User
9 PPM	9 PPM	9 PPM	9 PPM
HP LaserJet® II Emulation	HP LaserJet II/PostScript Emulation	HP LaserJet II/PostScript Emulation	HP LaserJet II/PostScript II Emulation
68000/TI ASIC	68000/TI ASIC	68000/TI ASIC	RISC/8220
14 HP fonts	17 scalable fonts	35 scalable fonts	35 scalable fonts
Prints TrueType fonts	Prints TrueType fonts	Prints TrueType fonts	Prints TrueType fonts
NOW $669	**NOW $765**	**NOW $810**	**NOW $1068**

All printers come with a 1 year limited warranty.† **AppleTalk®** kits available for Mac users for an additional $50.00.

Current microLaser Owners: *TURBO UPGRADE KIT* Was $1250 *NOW $399!!*

Call for immediate delivery before it's too late.

TI EXPRESS 1-800-847-2787 Ext. 500
PCs COMPLEAT 1-800-669-4727
CDW 1-800-884-4CDW
USA FLEX 1-800-888-2702
INSIGHT 1-800-859-5615
THIRD WAVE 1-800-880-7555

MacUser ★★★★½ MacUser microLaser XL Sept '91

MacUser ★★★★ MacUser microLaser PS35 Sept '92

MacUser ★★★★ MacUser microLaser Turbo Sept '92

MACWORLD MW EDITORS' CHOICE MACWORLD microLaser Series Sept '92

MACWORLD MW EDITORS' CHOICE MACWORLD microLaser Series Sept '93

*Dealer prices may vary. †Limited warranty, see dealer for details. AppleTalk and TrueType are registered trademarks of Apple Computer, Inc. HP LaserJet is a registered trademark of Hewlett-Packard, Inc. microLaser is a trademark of Texas Instruments. ©1993 TI

Circle 104 on reader service card.

ADVERTISEMENT

PC Computing®

★★★★★

Direct Top 40

Midwest Micro 5 star winner!

Company	Profile	Service	Price	Overall Rating
MidWest Micro 6990 U.S. Route 36 East Fletcher, OH 45326 (800) 682-7248 Fax: (800) 562-6622	MidWest Micro has been selling direct for 10 years. Offerings include the Elite line of PCs and notebooks, as well as peripherals and printers. Its warranty includes a guarantee that your system is fixed within three days. Most standard configurations are shipped within 24 hours. **Business hours:** Mon.–Fri. 9–7, Sat. 10–4. **Tech support:** Mon.–Fri. 9–7, Sat. 10–4. **Money-back guarantee:** 30 days for systems and notebooks. **Warranty:** 1 year for systems and notebooks.	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆	★ ★ ★ ★ ★

Reprinted from "PC Computing" August 1993.
©1993 Ziff Communications Company.

Circle 276 on reader service card.

Products & Services That Please Your Palette… At Prices That Please Your Wallet

Picture your ideal computer system. Does it have a large hard drive... a high-resolution monitor...a sleek, sturdy design? The system you're imagining can be a reality. Call the computer professionals at MidWest Micro today.

Winner of 14 Computer Shopper Best Buy Awards and PC Computing's Five-Star Rating for outstanding service and price performance, MidWest Micro offers creative, cost-effective solutions for all your computing needs.

30-Day Complete Satisfaction Guarantee

Purchasing an Elite System or Notebook from MidWest Micro is risk-free. Try an Elite System or Notebook for 30 days. If it doesn't meet your needs send it back and we'll refund your money. It's that simple.

Technical Support/Customer Service

Our System Consultants do more than answer questions; they listen to your needs, analyze the situation and then recommend a solution. You can depend on MidWest Micro's Technical Staff to help keep your Elite up and running through even the most difficult applications.

COMPUTER SHOPPER Best Buy OF 1992

Guaranteed Performance

Because you need a computer you can depend on, Elite Systems, Notebooks and SubNotes are backed by a one year warranty. During that time we offer immediate parts replacement for components which you can easily install. For internal repairs, simply send us your system or notebook and we'll correct the problem within 72 hours.

24-Hour Shipping

Why wait weeks to get the system you want? Order from MidWest Micro and get your Elite System or Notebook fast. Most standard configurations are shipped within 24 hours. If you'd prefer a custom configuration, we'll do our best to have it on your doorstep within 72 hours.

Custom Configuration

Get your system or notebook the way you want it. We can install fax modems, Microsoft Windows, more RAM, a larger hard drive and all the other accessories you've been looking for in a system. Ask your sales representative for details.

PC Computing ★★★★★

Elite Systems — The Reason Other Companies Are Going Back To The Drawing Board

Classic Styling

Each component of an Elite System perfectly complements the other. From the fastest motherboards to the highest resolution monitors, the most reliable hard drives and the durable cases which frame our Elite Systems, you can be sure you're getting the best system available for your money.

Rich In Features

Elite Systems come with SVGA cards, high-speed RAM, 3.5" floppy drives, formatted hard drives and Microsoft DOS 6.0 and Microsoft Windows* installed.

Call MidWest Micro today. You'll be glad you did.

*Some configurations do not ship with Windows.

VESA Value Systems

486DX-33 $1529
#006329

Elements

- VESA Local Bus Motherboard
- Intel 80486DX-33 Processor
- 128K High-Speed Cache
- 4 Mb High-Speed RAM
- 32-Bit VESA Local Bus IDE Card
- 245 Mb IDE Hard Drive
- 1.44 Mb 3.5" Floppy Drive
- 1.2 Mb 5.25" Floppy Drive
- 14" SVGA .28 Non-Interlaced Color Monitor
- 32-Bit VESA Local Bus SVGA Video Card
- 1 Parallel, 2 Serial & 1 Game Port
- 101-Key Enhanced Keyboard
- High-Resolution, 3-Button Mouse
- 5-Bay Mini-Tower Case
- FREE Microsoft DOS 6.0 Installed
- FREE Microsoft Windows Installed

486DX2 -50 $1599
#006330

486DX2 -66 $1749
#006331

VESA Windows Systems

486DX-33 $1699
#006332

Elements:

- VESA Local Bus Motherboard
- Intel 80486DX-33 Processor
- 128K High-Speed Cache
- 4 Mb High-Speed RAM
- 32-Bit VESA Local Bus IDE Card
- 245 Mb IDE Hard Drive
- 1.44 Mb 3.5" Floppy Drive
- 1.2 Mb 5.25" Floppy Drive
- √ 15" SVGA .28 Non-Interlaced Multi-Scan Color Monitor
- √ Diamond Stealth 24 VESA Local Bus SVGA Video Card
- 1 Parallel, 2 Serial & 1 Game Port
- 101-Key Enhanced Keyboard
- High-Resolution, 3-Button Mouse
- √ 7-Bay Full-Tower Case
- FREE Microsoft DOS 6.0 Installed
- FREE Microsoft Windows Installed

486DX2-50 $1749
#006333

486DX2-66 $1899
#006334

VESA Multimedia Systems

486DX-33 $1929
#006335

Elements:

- VESA Local Bus Motherboard
- Intel 80486DX-33 Processor
- 128K High-Speed Cache
- 4 Mb High-Speed RAM
- 245 Mb IDE Hard Drive
- 32-Bit VESA Local Bus IDE Card
- 1.44 Mb 3.5" Floppy Drive
- √ Dual Speed Multi-Session Multimedia CD-ROM Drive
- √ 3 Disk CD-ROM Software Library
- √ 16-Bit High-Performance Sound Card
- √ Digital-Quality, Compact Speakers!
- √ 15" SVGA .28 Non-Interlaced Multi-Scan Color Monitor
- 32-Bit VESA Local Bus SVGA Video Card
- 1 Parallel, 2 Serial & 1 Game Port
- 101-Key Enhanced Keyboard
- High-Resolution, 3-Button Mouse
- 5-Bay Mini-Tower Case
- FREE Microsoft DOS 6.0 Installed
- FREE Microsoft Windows Installed

486DX2-50 $1999
#006336

486DX2-66 $2149
#006337

VESA CAD Systems

486DX-33 $2329
#006338

Elements:

- VESA Local Bus Motherboard
- Intel 80486DX-33 Processor
- 256K High-Speed Cache
- √ 8 Mb High-Speed RAM
- 32-Bit VESA Local Bus IDE Card
- √ 340 Mb IDE Hard Drive
- 1.44 Mb 3.5" Floppy Drive
- 1.2 Mb 5.25" Floppy Drive
- √ 17" SVGA .28 Non-Interlaced Digital Color Monitor
- √ Diamond Stealth 24 VESA Local Bus SVGA Video Card
- 1 Parallel, 2 Serial & 1 Game Port
- 101-Key Enhanced Keyboard
- High-Resolution, 3-Button Mouse
- 7-Bay Full-Tower Case
- FREE Microsoft DOS 6.0 Installed
- FREE Microsoft Windows Installed

486DX2-50 $2439
#006339

486DX2-66 $2559
#006340

Multimedia Package

Experience The Thrill Of Sound And Motion!

Package Includes:

- Dual-speed CD-ROM drive
- Aztech Sound Galaxy BX II Sound Card,
- Speakers
- CD-ROM titles: U.S. Atlas, 21-volume Multi-Media Encyclopedia, Reference Library

Policy: No service charge for credit card orders. Prices are subject to change. Repair or replacement of defective products is at MidWest Micro's discretion. We are not responsible for errors in typography and photography. Original shipping and handling fees, as well as return shipping charges, are non-refundable. There are no returns for credit after 30 days. The following are subject to a restocking fee: items returned after 30 days, products returned in non-resellable condition, products returned in cartons other than the original. All products are trademarks of their respective manufacturers. All registered and unregistered trademarks are the sole property of their respective companies

MidWest Micro

6910 U.S. Route 36 East, Fletcher, Ohio 45326

1-800-682-7248

Fax: 1-800-562-6622

Monday–Friday: 9 a.m. to 7 p.m. Saturday: 10 a.m. to 4 p.m.

For your protection we check domestically for stolen credit cards

AD#M1101

Circle 272 on reader service card.

Picture Perfect For Home, Office Or Travel

Elite 486SX/DX Notebooks

Enhance Your Images With Intel's "SL-Enhanced" Processors

For robust power management and long battery life, choose Elite 486SX/DX Notebooks featuring Intel's 486 "SL-Enhanced" microprocessors. Designed especially for portable computers, these chips support the system management mode (SMM) which lets power management software operate independently of the operating system. And because they have a static design, the clock signal can be slowed or stopped to conserve power.

Beyond power management, Intel's 486 "SL-Enhanced" processors are upgradeable to deliver the high-end processing speeds you'll need in the future. Choose between a 486SX-25, 486DX-33 or 486DX2-50 and feel confident that the Elite Notebook will meet your needs for years to come.

486SX/DX Notebooks are available with a 10" active-matrix color, dual-scan color or monochrome screen and up to a 340 Mb hard drive to capture your work in style. For maximum versatility they also come with a PCMCIA Type III slot which accepts two Type II cards or one Type III card. Swap modems, LAN, storage, or flash cards without powering down.

Order your 486SX/DX Notebook today and discover how Elite Notebooks raise computing to a fine art.

120 Mb	486SX-25	486DX-33	486DX2-50
Monochrome	005501 $1599	005516 $1849	005531 $1999
Dual-Scan Color	005506 $2349	005521 $2599	005536 $2749
Active-Matrix Color	005511 $3199	005526 $3399	005541 $3599

For an 80 Mb hard drive subtract $40. For a 200 Mb hard drive add $100.
For a 340 Mb hard drive add $280.

*Battery life measured with Power Management enabled. Actual battery life may vary.

Elements:

Processor:
Intel 486SX-25, 486DX-33 or 486DX-50 SL-Enhanced upgradeable processor

RAM:
4 Mb, expands to 20 Mb

Hard Drive:
80 Mb, 120 Mb, 200 Mb or 340 Mb

Screen:
10", 640 x 480 VGA resolution
Backlit display
Color - 256 colors
Monochrome - 64 gray shades

Battery Life*:
Active-Matrix Color - 3 hours
Dual-Scan Color - 4 hours
Monochrome - 6 hours

Weight:
Color - 6.9 lbs.
Monochrome - 6.4 lbs.

512K DRAM plus 64K VRAM for turbo bus accelerated video technology

Simultaneous video on active-matrix and monochrome models

86 keys with 101-key emulation

Built-in trackball

Built-in 1.44 Mb, 3.5" floppy drive

Advanced Power Management

One parallel and one serial port

External VGA and keyboard connectors

One PCMCIA Type III slot/ two Type II slots

FREE AC adapter and utilities disk

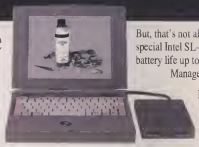
FREE MS-DOS 6.0 installed

Brilliant Ideas Require Brilliant Performance

Elite 486SX-25 SubNote

Illustrate Your Points On This 10" Screen

You'd think a small 3.9 lb. SubNote would be hard to work on—but it's not. Elite's 486SX-25 SubNote delivers 640 x 480 VGA resolution on its 10" high-contrast screen so you can illustrate charts and graphs that are easy to read.
And unlike other notebooks that leave your wrists hanging, the Elite SubNote offers a built-in trackball and extended palm rest to support wrists.



But, that's not all! The Elite SubNote receives rave reviews for its special Intel SL-Enhanced processor that conserves power and extends battery life up to five hours when combined with Advanced Power Management.

For extra power take advantage of the SubNote's PCMCIA Type II slot. It lets you insert credit-card sized PC cards for modems, flash memory, network adapters and more.

Get the picture? Now get the Elite 486SX-25 SubNote and get a whole new view of portable computing!

486SX-25 SubNote

Model	Item #	Price
80 Mb	005575	**$1499**
120 Mb	005576	**$1549**
200 Mb	005577	**$1639**
340 Mb	005578	**$1799**

Elements:

Processor:
Intel 486SX SL-Enhanced upgradeable processor
Processing Speed:
25 MHz
RAM:
4 Mb expands, to 12 Mb
Hard Drive:
80 Mb, 120 Mb, 200 Mb or 340 Mb
Screen:
10", 640 x 480 VGA resolution
Backlit display
64 gray shades
Battery Life*:
5 hours
Weight:
3.9 lbs.
512K DRAM plus 64K VRAM for turbo bus accelerated video technology
Simultaneous video
83 keys with 101-key emulation
Built-in trackball
External 1.44 Mb, 3.5" floppy drive
Advanced Power Management
Nickel metal hydride battery
One parallel and one serial port
External VGA and keyboard connectors
One PCMCIA Type II slot
FREE AC adapter and utilities disk
FREE MS-DOS 6.0 installed

Elite 486SLC-33 Color/Monochrome Notebook

o486 Notebooks At Starving Artist Prices

Get more power for your money with Elite 486SLC-33 Notebooks. Available in color or monochrome, these notebooks come with fast 33 MHz Cyrix processors, internal cache memory, and up to 8 Mb of RAM.

For maximum system flexibility, you can add an additional RAM module, a V.42bis internal fax modem or an external docking station.

Both models provide non-glare VGA screens that eliminate distortion, flickering and eye strain so you can compute comfortably. Text and graphics appear at 640 x 480 resolutions in 64 gray shades or an eye-catching 256 colors for graphic and spreadsheet applications.

And if you get caught up in your creative endeavors, a quick glance at the LCD panel lets you know which drives are being accessed, when battery power is low, what function keys are enabled, whether external power is being used and if there is a modem ring.

Affordably priced Elite 486SLC-33 Color/Monochrome Notebooks are a real work of art. Order yours today!

486SLC-33 Notebooks

Color

Model	Item #	Price
80 Mb	005461	**$1699**
120 Mb	005466	**$1769**
200 Mb	005471	**$1889**

Monochrome

Model	Item #	Price
80 Mb	005446	**$1209**
120 Mb	005451	**$1279**
200 Mb	005456	**$1399**

Elements:

Processor:
Cyrix 486SLC-33
Processing Speed:
33 MHz
RAM:
2 Mb RAM, expands to 8 Mb
Hard Drive:
80 Mb, 120 Mb or 200 Mb
Floppy Drive:
Built-in 1.44 Mb 3.5"
Screen:
Color - 9", 256 colors
Monochrome - 10", 64 gray shades
Video RAM:
Color - 512K
Monochrome - 256K
Keyboard:
83 key with 101-key emulation
2-button thumball mouse
Weight:
Color - 5.7 lbs. with battery
Monochrome - 5.4 lbs. with battery
Battery Life*:
Color - 4 hours
Monochrome - 6 hours
640 x 480 resolution
Simultaneous video
Advanced Power Management
One parallel and one serial interface
External VGA monitor and keyboard connectors
FREE AC adapter carrying case and MS-DOS 6.0 installed
One year manufacturer's warranty

MidWest Micro
6910 U.S. Route 36 East, Fletcher, Ohio 45326
1-800-682-7248
Fax:1-800-562-6622
Monday-Friday 9 a.m. to 7 p.m. Saturday 10 a.m. to 4 p.m.

MasterCard VISA DISCOVER

For your protection we check thoroughly for stolen credit cards. Prices and availability are subject to change. We are not responsible for errors in typography and photography. See policy statement for further details.

*Battery life measured with Power Management enabled. Actual battery life may vary.

AD#M1103

Circle 237 on reader service card.

DUSTIN DELIVERS

DOS ● WINDOWS ■ MPC ✚
O/S2 ◆ HARDWARE ★

ACCOUNTING & FINANCE

ACC PAC BPI Series ●	CALL
DAC Easy Accounting 4.3 ●	105
MS Money ■	25
MS Profit ■	135
Peachpay ●	55
Peachtree Accounting ■	125
Peachtree Complete ●	195
Quicken 2.0 ■	49
Quicken 6.0 ●	49
Quickpay ●	45

BUSINESS GRAPHICS

All Clear ★ ■	179
CA Cricket Paint ■	99
CA Cricket Graph ■	89
CA Cricket Presents ■	129
Flowcharting 3 ●	145
Formfiller 3.0 ●	75
Freelance Graphics ● ■	349
Freelance Graphics Upgrd ● ■	109
Harvard Graphics ● ■	CALL
Perform ■	195
Powerpoint For Windows ■	325
Visio ■	199
WP Presentation ■	295

CAD/ORAFTING

Autosketch 3.0 ●	99
Autosketch ■	155
Design CAD 2D/3D ●	CALL
Design CAD Professional ●	595
Generic 3D Drafting ●	209
Generic CAD 6.1 ●	309
Turbo Cad ■	69

COMMUNICATIONS/ NETWORKING

Carbon Copy Plus ● ■	145
Crosstalk 2.0 ■	105
Hyperaccess ● ■ ◆	CALL
Lantastic Products ● ■	CALL
Laplink Pro 5.0 ●	109
Novell Products ●	CALL
PC Anywhere 4.5 Host/Rmt ●	119
Procomm Plus ●	79
Procomm Plus ■	99
Q-Modem Pro ●	65
Wildcat BBS ●	89
Windows For Workgroups ■	CALL
Winfax Pro ■	89

DATABASE/DEVELOPMENT

Access ■	325
Approach ■	CALL
CA Clipper ●	479
CA Clipper Comp. Upgrade ●	159
CA Clipper Tools ●	445
CA Ret/Xbase ■	195
Db Fast ■	339
dBase IV ●	519
Filemaker Pro ■	135
Foxpro 2.5 ● ■	329
Instant Database ■	55
Paradox ● ■	CALL
Paradox LAN Pack ●	289
Paradox Upgrade ●	CALL
D & A 4.0 ●	265

DESKTOP PUBLISHING & FONTS

Acrobat ■	135
Effects Specialist ■	109
Font Chameleon ■	CALL
Fontminder ■	65
Fontmonger ■	105
Fontmonger/Typestry Bundle ■	195
GDCR 2.0 ■	109
Infinitype Plus ● ■ ◆	59
Pagemaker ■	529
PFS First Graphics ●	65
Masterpiece True Type ■	45
MS Publisher ■	139
Recognita + Int'l ● ■	419
Ventura Publisher 4.1 ■	525

EDUCATION & TRAINING

Auto Insight ●	55
Automap ● ■	65
Automap Europe ●	89
Body Works ●	49
City Streets ●	65
French Assistant ●	65
German Assistant ●	65
Italian Assistant ●	65
Knowledge Adventure ●	CALL
New Car Finder ●	35
PC Study Bible ●	CALL
Power Translator ●	179
Typing Tutor VI ● ■	39
Where is Carmen Sanes ●	CALL

GAMES & ENTERTAINMENT

Capitalist Pig ■	45
Eye of the Beholder 3 ●	55
Falcon 3.0 ●	55
Flight Simulator 4.0 ●	49
Jurassic Art ●	39
MS Entertainment Pack ■	CALL
Pilot's Choice Bundle ●	119
Roam of Arkana ●	49
Tetris ● ■	29
X Wing ●	49

GRAPHICS & CLIPART

Corel Draw 3.0 ■ ◆	139
Corel Draw 4.0 ■ ◆	399
Cricket Paint ■	99
Freehand ●	409
Designer ■	469
Harvard Draw Upgrade ■	CALL
Harvard Draw ■	189
HiJaak ● ■	95
Illustrator ■	389
Photoshop ■	589
Photostyler ■	545
Presentation Task Force ● ■	129

INFORMATION & PROJECT MANAGEMENT

Act! ● ■	CALL
Calendar Creator ■	49
Descriptions Write Now ●	95
Info Select 2.0 ● ■	99
Lotus Organizer ■	99
Manage Pro ■	239
MS Project ● ■	CALL
On Target ■	269
Pack Rat 5.0 ■	249
Planmaker ●	85
Policies Wnte Now ●	125
PowerLeads ■	199
Timeline ●	455
Write Your Congressman ●	35

INTEGRATED

Borland Office ■	CALL
MS Office ■	489
PFS First Choice ●	99
Simply Business Bundle ■	425
Smart Suite ■	469
Works ■ ★	CALL

MATHEMATICAL

Mathcad 3.0 ■	325
Statgraphics 5.1 ●	689
Systat Dual ●	795

MODEMS

Accura 14.4 Internal ★	245
Accura 9600 Internal ★	189
Hayes Smartmodems ★	CALL
Optima 144 + Fax 144 ★	419
Optima 96 + Fax 96 ★	395
PM14400FX Send/Rec Fax ★	219
PM9600 V.32/V/42 BIS ★	189
Sportster 9600 ★	185
Sportster 14.4 w/fax ★	199
Viva 14.4 Int ★	189
WorldPort 2400 ★	149

OPERATING SYSTEMS

Desqview 2.4 ●	85
MS DOS 6.0 ●	CALL
OS/2 ◆	155
SCO Unix/Xenix ●	CALL
Windows 3.1 ■	99
Windows 3.1 Upgrade ■	55
Windows NT ■	CALL

PERIPHERALS & ACCESSORIES

IMSI Mouse ★	29
Mouseman ★	79
MS Mouse ★	95
PC Primetime ★	399
Scanman Mode 256 ★	275
Thrustmaster ★	89
Video Clipper ★	355

PROGRAMMING

Borland C++ ● ■	349
MS Visual Tools Suite ■	265
Multimedia Toolbook ■	535
Smalltalk ■	325
Smalltalk V ●	99
Turbo C++ ● ■	CALL
Turbo Pascal 7.0 ●	119
Visual Basic ● ■	139

SPREADSHEETS

CA Compete ■	CALL
Excel ■ ★	319
Excel Comp. Upgrade ■	129
Improv ■	125
Lotus 123 V3.4 ●	419
Lotus 123 V2.4 ●	349
Lotus 123 V4.0 ■	339
Lucid ●	45
Quattro Pro ● ■	CALL

UTILITIES

After Dark ■	35
Dashboard ■	49
Direct Access ● ■	59
Double Tools ● ■	75
Fastback Plus ● ■	109
Full Armor ●	59
Help ● ■	95
Lightning ● ■	CALL
Midi Made Music ■	29
Norton Antivirus ● ■	95
Norton Back-Up ● ■	95
Norton Desktop ● ■	119
Norton Utilities ●	119
PC Kwik Powerpak ●	89
PC Tools Deluxe 8.0 ● ■	139
Pentascic ●	45
Pentacsic/Dashboard Bundle ■	69
Power Search ●	65

HERE. FREE!

Print Cache ●	CALL
QEMM 386 ●	69
Ready Aim Fite ★ ■	85
Stacker ● ■	99
Star Trek Screen Saver ■	45
Superstor Pro ● ■	95
X Tree ■	75
X Tree Gold 2.5 ●	99

WORD PROCESSING

Ami Pro V3.0 ■	249
Ami Pro V3.0 Upgr ■	99
CA Textor/Grammatic Bndl ■	99
MS Word ●	CALL
MS Word ■ ●	CALL
MS Word Upgrade ■	CALL
Wordperfect ★ ●	CALL
WordPerfect Upgrade ● ■	CALL

CD ROM DRIVES & KITS

Mitsumi CRMC ★	199
NEC CDR-74 ★	599
NEC CDR-84 ★	495
NEC Express PC ★	379
NEC Multimedia Gallery PC ★	925
Procom Mitsumi Bndl. Int ★	399
Procom Toshiba Bndl. Int. ★	769
Sony 31A (Procom) Int. ★	259
Sony 31A (Procom) Ext. ★	315
Sound Blaster Edutainment ★	CALL
Sound Blaster Discovery ★	CALL
Toshiba 3401 (Procom) Int. ★	485
Toshiba 3401 (Procom) Ext. ★	599

Call for great bundle prices on CD-ROM drives and software!

CD SOFTWARE TITLES

Access (Kodak) ● ■	39
American Business Phone Book ●	35
American Heritage Enc/Dic ● ■	59
American Vista ✚	59
Animals, The ✚	59
Animal Encyclopedia ✚	59
Annabel's Dream ■ ✚	59
Atlas US President ✚	35
Audubon's Birds ●	39
Audubon's Mammals ●	55
Chessmaster 3000 ● ✚	59
CIA World Tour ● ✚	29
Composer Quest ●	39
Compton's Family Encyc. ●	195
Global Explorer ■	99
Great Cities of the World ● ✚	39
Greatest Books Collection ● ■	39
Groiler's MM Encyclopedia ✚	235
Guiness Disc of Records '93 ■	65
Interactive Old Testament ●	55
Inspector Gadget ●	45
Jets and Props ●	49
Just Grandma and Me ●	45
King's Quest V ● ■	49
KGB/CIA World Fact Bk. ● ■ ✚	39
Majestic Places ● ■ ✚	35
Manhole ●	55
Money, Money, Money ● ■ ✚	35
Monkey Island ●	45
MS Beethoven ✚	59
MS Bookshelf ✚	135
MS Dinemania ✚	59
MS Dinosaurs ✚	CALL
MS Encarta ✚	259
MS Video ✚	135
Playing w/Language: English ■	45
Playing w/Language: French ■	45
Playing w/Language: German ■	45
Playing w/Language: Japanese ■	45
Playing w/Language: Spanish ■	45
Pro Phone '93 (7 Disks) ●	115
Secret Weapons of the Luftwaffe ●	59
Seventh Guest ✚	69
Stellar Conflict ●	55
Street Atlas USA ■	99
Tropical Rain Forest ●	35
Ultima Underworld ●	69
US Atlas ✚	39
US Presidents ● ■ ✚	39
USA Wars: Civil War ● ■	39
USA Wars: Desert Storm with Coalition Command ● ■ ✚	39
Where in the World (DLX) ●	65
Wild Places ●	35
Wildcat on CD-ROM ●	95
Wing Commander and Ultima Underworld ●	69
Wing Commander II Dlx ●	55
Windows Master ■	39
Winpack Bundle ■	99
World Atlas ✚	85
World Vista ✚	59

There are hundreds more CD titles in stock!

SOUND CARDS & ACCESSORIES

Altec Lansing Speakers ★	CALL
CD Caddies (6-pack) ★	39
CC150 Amplified Speakers ★	29
Labtec SS700 Speakers ★	39
Midi Mate ★	55
SS200 Amplified Speakers ★	29
SS700 Amplified Speakers ★	39
Sound Blaster Deluxe ★	99
Sound Blaster Pro Deluxe ★	129
Sound Blaster 16 ASP ★	239
Pro Audio Spectrum 16 ★	179
Pro Audio Studio 16 ★	235
Procom SCSI Card (16-Bit) ★	199
Procom SCSI Card (8-Bit) ★	79
Procom SCSI Xcelerators ★	CALL
Yamaha Speakers ★	CALL

There are hundreds more accessories available!

THE DUSTIN DIFFERENCE

Free Ground Shipping
Same Day Shipping
Overnight Delivery Available
PO's Welcome
Government & Educational Pricing
Visa, MC & AMEX Accepted
No Credit Card Surcharges
Credit Card Not Charged Until Shipping
Latest Versions Available
Manufacturers' Warranties & Documentation
Call for Any Items Not Listed

CALL FOR FREE CATALOGUE

DUSTIN
DISCOUNT SOFTWARE

Plain Wrap Prices,
Black Tie Service.

20969 Ventura Blvd., Woodland Hills, CA (818) 710-9174

Call Toll Free To Order
1-800-765-6214
Or Fax Your Order 24-hours
1-818-884-5310

We will promptly replace any defective items returned within 30 days, but cannot guarantee compatibility. There is a 15% restocking fee on any non defective, unopened goods and all returns must be accompanied by a Returned Merchandise Authorization. Software prices do sometimes fluctuate beyond our control and may change for better or worse without notice. While ground shipments are free we do ask $11 per item for 2-day $22 per item for overnight and $5 for C.O.D. Although shipping heavier items may be slightly more, bulk orders can be a lot less. Please call us for any item not listed.

Circle 145 on reader service card.

1,000,000 USERS, 10 AWARDS AND AN OFFER YOU CAN'T IGNORE.

No other software has credentials like these. Because no other software provides an easier-to-use collection of multimedia tools to help you make your presentations so memorable.

ACTION!

That's why major publications like *Macworld*, *MacUser*, *PC Magazine* and *Windows* have recognized Action! with so many awards in such a short time.

And now, with our $99 offer, there's never been a better time to join the million people who have helped to make Action! the overwhelming standard for multimedia presentations.

PRESENTING ACTION! FOR WINDOWS AND MACINTOSH.

Action! gives you the power to build complete multimedia presentations. Choose from dozens of professionally designed templates. Or import your Freelance, Persuasion, PowerPoint or Harvard Graphics files into Action!

NOW GET ACTION!

THE WORLD'S MOST POPULAR MULTIMEDIA PRESENTATION SOFTWARE FOR ONLY

$99*

MACROMEDIA

Then you can add impact by animating any element of your presentation and building-in sound, QuickTime® movies, or Video for Windows™ clips from our free ClipMedia™ library. You can present on any Mac- or Windows-based laptop or desktop PC. And you can even *present* without being present by distributing your presentations on videotape, or using our free runtime player to reach the largest possible audience.

ASK ABOUT THE ACTION! BUNDLE.
Our new bundle includes Action! *-PLUS-* sound-editing software, *and* The Perfect Presentations ClipMedia library all on a single CD-ROM disk.

DUSTIN DISCOUNT SOFTWARE

Plain Wrap Prices, Black Tie Service.

Call Toll Free to Order 1-800-274-6611
FAX your order 24-hours 1-818-884-5310

20969 Ventura Blvd., Woodland Hills, CA 91364 818-710-9174
Prices subject to change without notice.

TOOLS TO POWER YOUR IDEAS.

*Competitive upgrade price for current users of any Mac- or Windows-based presentation software package. (Proof required: photocopied title page of user's manual.) North America only. Expires 12/31/93
All registered marks and trademarks are the properties of their respective holders. ©1993 Macromedia, Inc. All rights reserved.

Circle 176 on reader service card.

NECESSARY OPTIONS

FOR STRESS AND EXCESS

Based on the highly acclaimed Business One/Irwin book by Kim Komando, 401 Great Letters For Windows, provides an instant source of valuable letters for any occasion—business or personal—and saves you the drafting time and energy spent on finding the right words. Simply select the letter type, choose the topic, fill-in the blanks, and than print, modify or save your letter!

401 Great Letters For Windows™
Your Key To Successful Correspondence™

$39

Hints help you fill in the blanks for 115 business-to business letters, 115 business-to-customer letters, 115 internal company letters, and 56 personal letters. So, take the stress out of effective letter writing; with 401 Great Letters For Windows writing the perfect letter has never been easier!

JUST RECENTLY RELEASED

Join the "Eco-techno" revolution! Combine your PC and the environment with The Green Explorer, an intensive, interactive program containing thousands of ideas on how to become a more "eco-friendly" consumer. This Windows compatible software has over 150 detailed graphics and text windows providing information on everything from recycling glass and reusing plastic to mixing "green" cleaning products. The Green Explorer includes a special "projects" section that serves as a how-to guide for "eco-actions" ranging from merely writing your legislator to disposing of hazardous household waste. Simply click on the appropriate icon or term, and the program will show you how to accomplish your required action. The extensive historical database and games/quiz sections allow you to have fun with this easy-to-use, educational program designed to set up a "green" household or office.

Green Explorer™
Your Blueprint for a "Green" Household™

$49

The MicroSqueez offers a fun, yet practical way to relieve the stress and strain of keystroke intensive tasks. The MicroSqueez is ergon-omically designed to build strength in the fingers, hands, wrists, and forearms. It is an effective tool for limbering up before and during extended typing sessions. Superior to other hand strengtheners, MicroSqueez is 50% resilient, which creates greater finger dexterity and flexibility, a preventative step against Carpal Tunnel Syndrome, Tendinitus and Repetitive strain Injuries.

UNCONDITIONAL MONEY BACK GUARANTEE

ONLY $9

with any purchase from Dustin, or $15 if purchased by itself

MicroBase Publishing, Inc.

Published by MicroBase Publishing, Inc.

DUSTIN
DISCOUNT SOFTWARE

Plain Wrap Prices,
Black Tie Service.

20969 Ventura Blvd., Ste. 13, Woodland Hills, CA 91364. (818) 710-9174

TO ORDER CALL TOLL-FREE
M-F 6AM-6PM, Sat 10AM-2PM PST
800-933-7754
OR FAX 818-884-5310

FREE GROUND SHIPPING

Pricing and availability subject to change without notice. All items are new. P.O.'s accepted from qualified buyers—net 30. Shipping is non-refundable. Opened software is not returnable. All trademarks are property of their respective owners.

Circle 177 on reader service card.

WE DARE YOU TO COMPARE !

30 DAY
MONEY BACK GUARANTEE

THE SOURCE FOR STORAGE SOLUTIONS

DRIVE PRICES GO DOWN - CALL FOR CURRENT PRICES

Best Prices, Customized Solutions, Widest Product Selections!
Toll - Free Tech Support !

STORAGE SOLUTIONS FOR ANY COMPUTER SYSTEM ON ANY OPERATING SYSTEM.

S.A.G. expert technicians and knowledgeable sales personnel have been providing hard drives and storage systems to the international computer service industry since 1987.

We have been satisfying the technical demands and needs of people who replace and upgrade computer systems for major corporations worldwide.

PRODUCT: We carry a full line of all storage products. Call for any product.

PRICE: Volume discounts available. Call for current prices.

TECH SUPPORT: Toll-free Mon - Fri 9AM - 6 PM EST

DELIVERY: We offer immediate delivery and have a 92% rate of shipping the same day.

PAYMENT: VISA, Master Card, Corporate, Government and Educational purchase orders are welcome. No Surcharge For VISA, MC, or CODs.

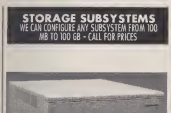
TOLL-FREE
1-800-989-3475

S·A·G
ELECTRONICS

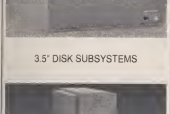
867 TURNPIKE STREET, NORTH ANDOVER, MA 01845
FAX (508) 689-0180 • OFFICES: MASS. & PENN.
Returns subject to restocking fee. RMA # must be acquired

STORAGE SUBSYSTEMS

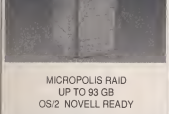
WE CAN CONFIGURE ANY SUBSYSTEM FROM 100 MB TO 100 GB - CALL FOR PRICES



3.5" DISK SUBSYSTEMS



MICROPOLIS RAID
UP TO 93 GB
OS/2 NOVELL READY



REMOVABLE DISK SUBSYSTEMS

TOWER SUBSYSTEMS
8 DRIVE SOLUTION

SEAGATE **2YR & *5YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
SCSI				
ST32831N	248	1"	12	$ 287
ST33106N	341	1"	12	$ 376
ST33506N	456	1"	12	$ 488
ST36606N	525	1"	11	$ 638
ST36536N	500	1"	10	$ 599
ST36106N	535	1"	11	$ 849
ST41676N	665	FH	12	$ 908
ST42100N	1037	FH	15	$ 939
ST31200N*	1050	3.5	11	$ 885
ST31200N*	1050	1"	9	$ 1057
ST41600N	1370	FH	12	$ 1500
ST41650N	1415	FH	15	$ 1074
ST18951N*	1700	3.5	8	$ 1526
ST18951N*	1700	3.5	9	$ 1187
ST42100N*	1900	FH	13	$ 1363
ST12400N*	2100	3.5	9	$ 1630
ST12550N*	2265	3.5	8	$ 1663
ST12400N*	2306	FH	10	$ 1889
ST43400N*	2912	FH	10	$ 2139
IDE				
ST3144A	130	1"	16	$ 164
ST3243A	212	1"	12	$ 199
ST3283A	245	1"	12	$ 228
ST3390A**	260	1"	16	$ 2201
ST33906**	341	1"	12	$ 2971
ST3555A	452	1"	12	$ 402
ST3655A**	600	1"	12	$ 557

MAXTOR 2YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
SCSI				
71455	345	1"	15	$ 338
70455	340	1"	15	$ 328
LXT540S7	540	3.5	8.5	$ 709
71051	1050	3.5	8.5	$ 895
90175II	1400	FH	13	$ 1145
IDE				
7131A	130	1"	15	$ 173
72133	213	1"	15	$ 209
72245A	245	1"	15	$ 228
7345A	340	1"	14	$ 294
540A	540	3.5	8.5	$ 709

QUANTUM 2 YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
LS170S-A	170	1"	17	$ 383
LPS240S-A	240	1"	16	$ 253
LPS525S-A	525	1"	10	$ 578
FIREBIRD	1250	3.5	10	$ 891
FIREBIRD	1225	3.5	10	$ 999

WESTERN DIGITAL

TYPE	MB	SIZE	SEEK	PRICE
IDE				
WD2200C	200	1"	14	$ 201
WD2250	245	1"	14	$ 221
WD2340C	340	1"	13	$ 291
WD2420	420	1"	13	$ 395

CD-ROM CHINON

CDS-535 INTERNAL KIT 650 MB	280MS	$ 350

MICROPOLIS RADION-CALL

MICROPOLIS 5YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
SCSI				
2105	560	3.5	10	$ 710
2108	699	3.5	10	$ 965
2212	1050	3.5	10	$ 885
2217	1750	3.5	10	CALL
1926	2100	FH	11.5	$ 1689
1936	3050	FH	12	$ 2139
IDE				
2105A	560	3.5	10	$ 710
2213A	1035	3.5	10	$ 897
2217A	1750	3.5	10	CALL

MICROPOLIS RADION
RAID 5 SOLUTIONS FOR NOVELL, OS/2, UNIX, MAC
SOLUTIONS FROM 1 FOR VOLUME !! 1?? 99 OR VOLUME !!

FUJITSU 5YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
SCSI				
M2623FA	425	3.5	12	$ 584
M2624FB	520	3.5	12	$ 594
M2694	1080	3.5	10	$ 897
M2652S	1050	FH	11	$ 1850
M2654S	2061	FH	11	$ 1554
IDE				
M2624T	520	FH	12	$ 686

DEC 5YR WARRANTY

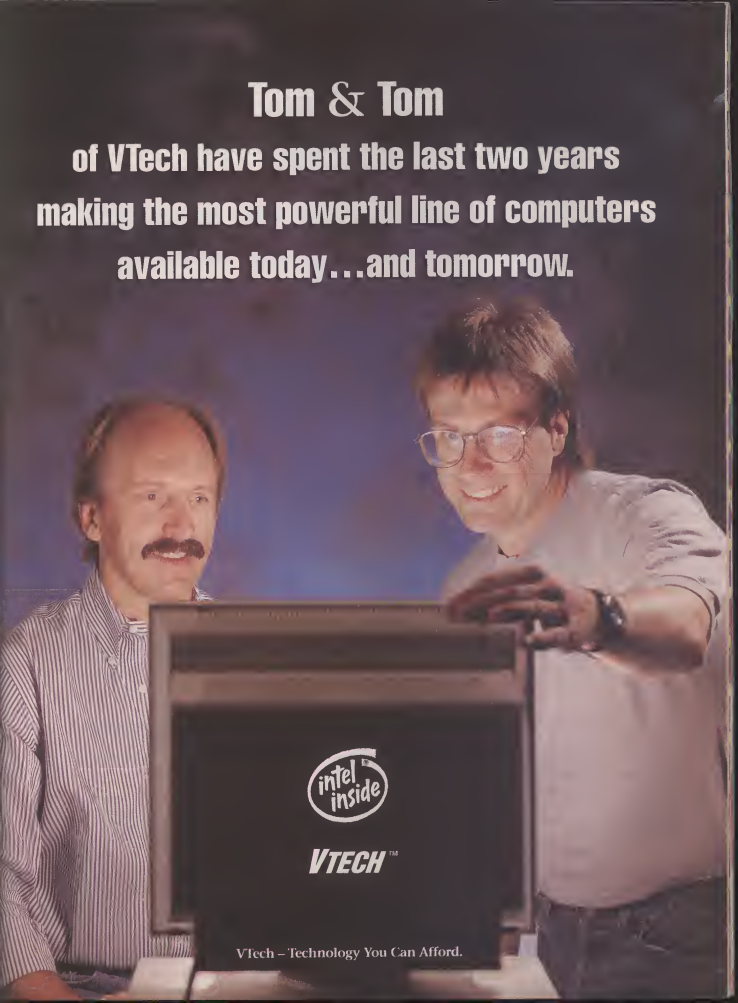
TYPE	MB	SIZE	SEEK	PRICE
SCSI				
DSP3105	1050	3.5	9.5	$ 941
DSP3840	1640	3.5	10	$ 1159
DSP5200	2060	FH	12.5	$ 1165
DSP3210	2100	3.5	10	$ 1735
DSP5350	3500	FH	11.5	$ 2352
DSP5400	4000	5.25	12	$ 2610

CONNER 1YR WARRANTY

TYPE	MB	SIZE	SEEK	PRICE
IDE				
CP30174	170	1"	17	$ 180
CP30204	212	1"	12	$ 209
CP30254	245	1"	14	$ 223
CP30344	340	1"	12	$ 303
CP30544	540	1"	12	$ 600
SCSI				
CP30170	170	1"	17	$ 189
CP30200	212	1"	12	$ 274
CP30540	540	1"	10	$ 600
CP33170	1370	3.5	10	$ 1019

TAPE DRIVES

TYPE	MB	SIZE	SEEK	PRICE
EXABYTE	8200	2GB	8MM	$ 1440
EXABYTE	8205	2GB	8MM	$ 1440
EXABYTE	8500	5GB	8MM	$ 2125
EXABYTE	8505	5GB	8MM	$ 2125
WANGTEK	5150	250MB	QIC	$ 386
WANGIAT	3100	2GB	DAT	$ 999
WANGIAT	3200	4GB	DAT	$ 1169
COLORADO	01-110	120MB	QIC	$ 144
COLORADO	01-250	250MB	QIC	$ 175
COLORADO	11-20	250MB	P-DGT	$ 340


Tom & Tom
of VTech have spent the last two years
making the most powerful line of computers
available today...and tomorrow.
intel inside
VTECH™
VTech – Technology You Can Afford.

TWICE THE POWER. TWICE THE PERFORMANCE. TWICE THE EXPANDABILITY.

Introducing the VTech Platinum™ SMP Computers. Affordable systems that can be upgraded from single processor to dual processor.

The Next Wave in Personal Computing, Symmetrical Multiprocessing.

Introducing the VTech Platinum™ SMP computers, a revolutionary new line of desktop PCs with the future built-in, Symmetrical Multiprocessing or simply SMP. Developed at VTech by the industry's top advanced products engineering team, headed by Tom Craft and Tom Ludwig, the new VTech Platinum™ SMP computers set the performance pace. By combining current PC technology with workstation-like processing capabilities, these computers provide a level of power and performance that double existing desktop computing standards. Advanced technology affordably priced at today's standard 486PC level, the VTech Platinum™ SMP computers are uniquely positioned to meet emerging desktop and server applications while *protecting your investment against obsolescence.* No other 486 based computer can offer you this!

SMP brings program tasks into a dual processor environment. Each CPU shares the task working on separate parts of the program simultaneously which means double the processing capabilities. **More power to you!**

Symmetrical Multiprocessing or SMP allows two processors to work simultaneously. When two people share a job it's easier, faster, and a lot more gets done. The same is true with two processors working simultaneously. The VTech Platinum™ SMP computer, together with Windows NT, enables two processors to divide tasks between them. Like a two lane highway that suddenly becomes four lanes, processing flows with greater ease and efficiency. Two processors yielding twice the performance and power of traditional single processor PCs.

Everything You Want For Today. Everything You Need For Tomorrow.

No other competitor gives you the expandability options that VTech does. *When we say expandable, we mean expandable.* No more worrying about the specter of obsolescence. Each VTech Platinum™ SMP computer gives you the highest level of performance in Intel 486 based technology today while being user upgradable in the future with the Pentium™ OverDrive™ processor.

But more importantly, you can upgrade today, right now, immediately, when you need the muscle of multiprocessing. By adding a second processor board, along with the enabling software, your single processor system is transformed into a symmetrical multiprocessing system yielding twice the performance and power.

Circle 196 on reader service card.

VTech – Technology You Can Afford.

No One Else Brings You Symmetrical Multiprocessing Affordably. Not Dell. Not Compaq. Not IBM. Not Gateway. You Can Only Get It From VTech!

Starting with a single Intel 486DX2/50 or an Intel 486DX2/66 you can expand to double the power by adding a second processor board. Simply slip in the optional SMP Power Card and you're ready to fly. And when the OverDrive™ ready processor is released you can double that performance too! *The future is just waiting for you!*

Because every VTech Platinum™ SMP computer is delivered Windows NT ready, you are ready to take on today's applications and tomorrow's opportunities. No need to worry about having the RAM or hard drive space available. It's there. *No more hourglass!* With Windows NT running on the VTech Platinum™ SMP, the NT scheduler automatically spreads the workload among available processors which keeps you and your system humming!

MICROSOFT® WINDOWS NT™

VTech is Leading the Way!

With more than one million computers sold, VTech has earned its reputation as an innovative force in personal desktop computing. Strong and stable, with over one-half billion dollars in annual sales, 10,000 employees and operations located in 10 countries, VTech is respected around the world.The new VTech Platinum™ SMP computer is another milestone in our 17 year history, reflecting the VTech commitment to meeting your needs with state-of-the-art manufacturing, advanced product design, and quality technological solutions that will last into the future.

• Toll Free 24 Hour Tele-Tech Support
• Same Day Shipping • Bulletin Board Service
• 3 Year Limited Warranty • One Year On-Site Service
• 30 Day Money Back Guarantee
Call For Available Options: 1.800.883.2467

©1993 VTech Computers, Inc. All rights reserved. VTech Platinum™ SMP series patent pending. The Intel Inside and Pentium Processor Logos are registered trademarks of Intel Corporation. Other product names may be trademarks and/or registered trademarks of their respective companies. Prices, availability and specifications are subject to change without notice. Please call to confirm pricing. IL sales tax, availability, specifications and warranty details. VTech Platinum™ series also sold retail at Micro Center. VTech computers are manufactured and distributed by VTech worldwide: USA, Europe, Canada, Hong Kong, and Australia.

VTech – Technology You Can Afford.

The VTech Platinum™ SMP computers offer the latest in advanced technology. VESA local bus, two cooling fans, copy-back cache, self sensing set-up, mix and match SIMM configuration, SCSI-II, and Intel standard multiprocessing implemintation, are just a few of the performance enhancing features already built-in. Shown is the VTech Platinum™ SMP 486DX2/66² Dual Processor.

VTech SMP 486DX2/50 single	VTech SMP 486DX2/66 single	VTech SMP 486DX2/66 single	VTech SMP 486DX2/66² dual		
				VTech SMP 486DX2/50 single	$2299.
				VTech SMP 486DX2/66 single	$2499.
				VTech SMP 486DX2/66 single	$2999.
				VTech SMP 486DX2/66² dual	$3999.
■				Intel 486DX2/50 Processor with 256K Cache	
	■			Intel 486DX2/66 Processor with 256K Cache	
		■		2 Intel 486DX2/66 Processors with 256K Cache	
■	■	■	■	VESA Accelerated Local Bus	
■	■	■	■	S3 Windows Accelerator Video Card with 1Mb RAM	
■	■			8 Meg System RAM	
		■	■	16 Meg System RAM	
■	■	■	■	3.5" Disk Drive	
■	■			340 Meg Hard Drive	
		■	■	527 Meg Hard Drive	
		■	■	Dual Speed CD ROM	
■		■	■	15" Non-Interlaced Monitor	
			■	MP Dual Processor Power Card	
■	■	■	■	MS DOS 6.0, Windows 3.1, Hi-Res Mouse	
			■	Windows NT and Hi-Res Mouse	

3 YEAR WARRANTY

We pay attention to the details of every system we build. That's why we are able to confidently offer a three year warranty with one full year of on-site service.

Call 1.800.VTECH MP

In Canada 1.800.465.2737 Fax 1.800.947.3976

Mon.-Fri. 7am-8:30pm Sat. 9am-8pm Sun. 10am-3pm Central Standard Time

intel inside

VTECH™ Platinum™ series

800 Church Street, Lake Zurich, Illinois 60047

Novell Labs Tested & Approved

Circle 197 on reader service card.

Only a world class computer company can deliver so much computer for the money!

Only expotech™ BY VTECH™

Since 1977

The unbeatable value of Expotech systems is no surprise.

Consider our focus: improving existing design and manufacturing technology, in order to offer computer products that provide the most sought-after features and intelligent improvements at competitive prices.

That's the way it's been since VTech started up in 1977.

And Expotech is part of this global company, which does business in over 10 countries with over a half-billion dollars in sales.

It's one of the fastest growing PC manufacturers in the world, integrated to allow the entire manufacturing and assembly process to be completed in-house – every step, even including the design and development of our own motherboards and chip sets.

The Expotech division creates specific service and support programs to meet the needs of all our customers.

Research and development, too, is ongoing in three laboratories.

Here's where the innovative designs and manufacturing solutions are developed, advances that make it possible for Expotech to deliver an unbeatable blend of quality, price and performance – more computer for your money.

Over 1,000,000 square feet of manufacturing space handles virtually every aspect of production and assembly.

V-TECH - TECHNOLOGY YOU CAN AFFORD

Circle 198 on reader service card.

Only a successful company- with over 1,000,000 systems sold can dare to compare.

The "yes" answers in the comparison chart tell the most convincing story about Expotech value. Check it out for yourself. Compare feature for feature, service for service. No one offers a more comprehensive security and service package. But it's what you'd expect from a multi-national company determined to accelerate its growth. You can only do that by beating the competition. And you can only do *that* by satisfying customers. We have, over a million so far.

SERVICE FEATURE	expo tech	DELL	GATEWAY	ZEOS	compaq proliant	IBM Value Point
3 YEAR WARRANTY	YES				YES	
REMOTE DIAGNOSTICS	YES				OPTIONAL	
24 HOUR TECH SUPPORT	YES			YES	YES	YES
FREE ON SITE SERVICE	YES	YES	YES		YES	YES
OPEN 7 DAYS / WEEK	YES	YES		YES		
EXPRESS PARTS SERVICE	YES	YES	YES	YES		
FAX TECHNICAL ADVICE	YES	YES	YES	YES		
SAME DAY SERVICE	YES	YES	YES	YES		
SYSTEM FEATURE						
ANTI VIRUS SOFTWARE	YES					
FREE FAX/ MODEM	YES					
SERVICE VALUE RATING PC COMPUTING AUG. 1993	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Learning is fun with sight and sound...priced right!

expo MULITMEDIA 486sx

- Accelerated Local Bus
- Desktop Metal Case
- 1 Mb super VGA Video w/Windows Accelerator and displays 16.7 Million colors
- 1.44 Meg Floppy
- 102 Key Keyboard
- 14" Super VGA .28 Non Interlaced Monitor
- Multi I/O (2 Serial, 1 Parallel, 1 Game Port)
- MS-DOS 6.0, Windows 3.1, Hi-Res Mouse
- Commute Remote Diagnostic Software
- Anti-Virus Software
- 2400 Baud Modem w/Send-Receive Fax
- 4 Mb RAM, 250 Meg Hard Drive

$1499 Call 1.800.284.3976
in Canada 1.800.685.8284

- ***CD-ROM built-in*** ■ ***Stereo Sound Board***
- ***Plus 2 External Speakers*** ■ ***Ad-lib compatible***
- ***Sound Blaster Compatible*** ■ ***MPC Compatible***
- ***Internal MIDI Interface*** ■ ***Free CD-ROM Software***
- ***Comptons Family Encyclopedia***
- ***Webster's Dictionary*** ■ ***World Atlas***

3 YEAR WARRANTY

intel inside

ACCELERATED LOCAL BUS

V-TECH-TECHNOLOGY YOU CAN AFFORD

Circle 201 on reader service card.

Only a manufacturing company can afford to offer the lowest prices. Up to

25% lower

Superior performance at superior prices. How do we do it, offer lower prices than competitors like Compaq, IBM? When you're a manufacturer that designs and makes its own components, you cut out the middle man. that means lower costs for us. and for you. Check it out.

Only a quality driven company can stand behind its product with a

3 YEAR WARRANTY

Why can Expotech offer a longer warranty then others? Because our research engineers are continually improving existing product design and manufacturing technology to assure highest quality, full compatability and superior performance, we can offer a longer warranty than the leading competition.

Only an innovative company can offer a FREE software preview.

3 YEAR WARRANTY

Everything you need preloaded...ready to go

expo 486dx/33

- Accelerated Local Bus
- Desktop Metal Case, 128K Cache, 33Mhz
- 1 Mb super VGA Video w/Windows Accelerator and displays 16.7 Million colors
- 1.2 Meg Floppy, 1.44 Meg Floppy
- 102 Key Keyboard
- 14" Super VGA .28 Non Interlaced Monitor
- Multi I/O (2 Serial, 1 Parallel, 1 Game Port)
- MS-DOS 6.0, Windows 3.1, Hi-Res Mouse
- Commute Remote Diagnostic Software
- Anti-Virus Software
- 2400 Baud Modem w/Send-Receive Fax
- 4 Mb RAM, 340 Meg Seagate Hard Drive

expo 486dx33 w/4mb $1599
expo 486dx2166 w/8mb $1999
expo 486dx2/50 w/8mb $1899

TOWER OPTIONAL

intel inside

Novell Labs Tested & Approved

MICROSOFT WINDOWS COMPATIBLE

Software Modem & Service Package for Desktop & Tower Systems Only. All Prices Availability and Specifications subject to change without notice. Please call to confirm pricing & Sales Tax Availability and Warranty Details. The Intel inside logo is a trademark of Intel Corporation

Circle 200 on reader service card.

We've teamed up with Microsoft to offer pre-installed versions of the most popular software titles. Now you can buy only after you know about the software and know what's right for you.

- Every Expotech Desktop and Tower system comes pre-installed with the best titles from Microsoft
- Demos of some and explanations are given to you on line.
- When you decide you want to own the program, simply call the toll free number provided and buy the program (at deep discounted prices) with a credit card
- Instantly, you'll be given an unlocking key code that will release the full version of the program
- The full documentation and disks will be sent immediately

Only a committed company can offer services & support beyond the ordinary

- **Three year warranty**
- **One year on-site service.** Repaired at your site
- **24 hour tele-tech support.** Toll free tele-technical support available 24 hours a day, 7 days a week
- **Remote diagnostics.** On-site modem diagnostics
- **Same day shipping.** Base system models in stock ordered before 11 am CST can be shipped same day after credit approval
- **Next day parts replacement.** 24 hour express
- **30 day money back guarantee.** Full refund if you're not satisfied in the first 30 days after shipment
- **Bulletin board service.** Download drivers and talk-to techs on line
- **Visa, Mastercard, Discover**
- **Leasing available**
- **Purchase orders accepted.** COD and terms for qualified buyers

Only a technologically advanced company can build in so much value.

- Windows Accelerator with true 16.7 million color capability
- 2400//9600 baud Send/Receive Modem/Fax with every desktop system
- Large hard drive
- Remote diagnostics
- Non-interlaced 28 dot pitch monitor
- Upgradable
- Software pre-loaded

Quality...at affordable prices

expo 486sx/33

- Accelerated Local Bus
- Desktop Metal Case, 33 Mhz
- 1 Mb super VGA Video w/Windows Accelerator and displays 16.7 Million colors
- 1.2 Meg Floppy, 1.44 Meg Floppy
- 102 Key Keyboard
- 14" Super VGA .28 Non Interlaced Monitor
- Multi I/O (2 Serial, 1 Parallel, 1 Game Port)
- MS-DOS 6.0, Windows 3.1, Hi-Res Mouse
- Commute Remote Diagnostic Software
- Anti-Virus Software
- 2400 Baud Modem w/Send-Receive Fax
- 4 Mb RAM, 250 Meg Hard Drive

$1299 Call 1.800.284.3976 *in Canada 1.800.685.8284*

25Mhz only $1249

ACCELERATED LOCAL BUS

Only

expotech™ VTECH™

Since 1977

offers so much value, dependability and support.

For more information and to order call

1.800.284 EXPO FAX:1.800.947 EXPO

GOVERNMENT & EDUCATION 1.800.947.6461 CANADA 1.800.685.8284

7 days a week: CENTRAL STANDARD TIME
MONDAY-FRIDAY 7AM - 8:30PM
SATURDAY 9AM - 6PM SUNDAY 10AM - 3PM
AN EXPERIENCED KNOWLEDGEABLE REPRESENTATIVE
CAN HELP YOU WITH ANY QUESTIONS

expotech™ VTECH 800 Church Street Lake Zurich Illinois 60047
Circle 199 on reader service card.

V-TECH-TECHNOLOGY YOU CAN AFFORD

FASTER THAN MORE POWERFUL THAN ABLE TO LEAP . . .

Pardon us while we duck into a phone booth. According to the July, 1993, issue of PC/Computing, the ARES 486DX2/66 VL-Bus beat Compaq's Pentium-based 5/60M in every speed test PC/Computing ran. (We won't even talk about how badly we smoked Gateway.) Nothing new here, though. You've been telling us we're super for over 10 years. ARES has always been committed to providing you with the highest-quality product on the market, and backing that product with the industry's best service and support. Of course, we don't mind the occasional reminder. It gives us that much more incentive to strap on the red cape every day...

Pentium	Word for Windows (mixed tasks)	Excel test (graphics)	CorelDraw (graphics)
Compaq deskpro 5/60M (Pentium)	20% Faster	12% Faster	32% Faster
Ares 486DX2/66 VL-Bus	0% Faster	28% Faster	100% Faster
Gateway DX2-66	20% Faster	31% Faster	76% Faster
Compaq 486/50	Slower	Slower	Slower

TOP 100 PC Sources DIRECT PRODUCTS

EXPERTS' Windows SOURCES PICK

The ARES Flash 101 programmable keyboard: you've never used anything like it. Program and store up to 8 keyboard layouts, swap or remap keys, view and edit macros—it's the ultimate power tool.

Every ARES motherboard includes a 238-pin "P24T" socket for maximum expandability—clock triplers, Pentium-based overdrive chips, you name it.

Inside every case you'll find braided cables and sealed connections. Why are we so meticulous? Better airflow, for one thing. Easier access to components, for another. The little things mean a lot.

How do you make the very best computer even better? Add multimedia! ARES carries the very best in CD-ROM drives and sound cards. The pricing is pretty remarkable, too.

A SPEEDING PENTUM! A LOCAL-BUS GATEWAY! WELL, YOU GET THE IDEA.

ARES 486/66DX2 EISA/ISA/VESA

READY TO SHIP!

- Full-size Desktop case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-66DX2 Processor with Heat Sink
- 256K High-Speed Cache RAM, expandable
- 8MB RAM, expandable
- Teac 1.2MB and 1.44MB Floppy Drives
- Western Digital Caviar 340MB IDE Hard Drive
- IDE Floppy/HD Controller with 2 serial, 1 parallel, 1 game
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1550LR 15-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions, Digital Controls
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$2,645
$93/month, Business lease*

ARES 486/33DX EISA/ISA/VESA

- Full-size Desktop case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-33DX Processor
- 256K High-Speed Cache RAM, expandable
- 4MB RAM, expandable
- Teac 1.2MB and 1.44MB Floppy Drives
- Western Digital Caviar 320MB IDE Hard Drive
- IDE Floppy/HD Controller with 2 serial, 1 parallel, 1 game
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1550LR 15-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions, Digital Controls
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$2,095
$74/month, Business lease*

ARES 486/66DX2 FILE SERVER

- Full-size Tower case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-66DX2 Processor with Heat Sink
- 256K High-Speed Cache RAM, expandable
- 8MB RAM, expandable
- Teac 1.2MB and 1.44MB Floppy Drives
- Quantum 525MB SCSI-2 Hard Drive w/512K cache
- BusLogic VESA Local Bus SCSI-2 Controller
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1481LR 14-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$3,175
$111/month, Business lease*

ARES ASCENSION 486/66DX2 VLB

- Full-size Desktop case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-66DX2 Processor with Heat Sink
- 256K High-Speed Cache RAM, expandable
- 4MB RAM, expandable
- Teac 1.2MB and 1.44MB Floppy Drives
- Western Digital Caviar 210MB IDE Hard Drive
- IDE Floppy/HD Controller with 2 serial, 1 parallel, 1 game
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1481LR 14-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$1,975
$70/month, Business lease*

ARES ASCENSION 486/33DX VLB

READY TO SHIP!

- Full-size Desktop case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-33DX Processor
- 256K High-Speed Cache RAM, expandable
- 4MB RAM, expandable
- Teac 1.2MB and 1.44MB Floppy Drives
- Western Digital Caviar 210MB IDE Hard Drive
- IDE Floppy/HD Controller with 2 serial, 1 parallel, 1 game
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1481LR 14-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$1,745
$62/month, Business lease*

ARES ASCENSION 486/25SX VLB

- Full-size Desktop case with 250-watt power supply and Intellifan
- USA-made Motherboard with 3 VESA slots, 238-pin ZIF Socket
- Intel 486-25SX Processor
- 256K High-Speed Cache RAM, expandable
- 4MB RAM, expandable
- Teac 1.44MB Floppy Drive
- Western Digital Caviar 210MB IDE Hard Drive
- IDE Floppy/HD Controller with 2 serial, 1 parallel, 1 game
- Genoa 8500VL Video Accelerator w/1MB—upgradeable to 2MB
- CTX 1481LR 14-inch monitor with .28mm dot pitch, 72Hz refresh rate, MPR-II Low-Radiation Emissions
- ARES Flash 101 Programmable Keyboard
- Logitech 3-button Mouseman
- DOS 6, Windows 3.1 and QAPlus remote diagnostics, pre-installed, including documentation and disks

$1,475
$53/month, Business lease*

EVERY ARES SYSTEM INCLUDES:

- *3 VESA-standard 32-bit expansion slots*
- *A 238-pin ZIF "P247" socket*
- *An MPR-II low-radiation monitor*
- *256K high-speed cache RAM*
- *Eight expansion slots*
- *A Flash 101 programmable keyboard*
- *A Logitech 3-button MouseMan*
- *A 250-watt power supply with Intellifan*
- *The ARES Fixup Disk*
- *DOS 6 & Windows 3.1, pre-installed, with complete documentation and diskettes*

EVERY ARES CUSTOMER RECEIVES:

- *"Customer First" treatment from the computer industry's friendliest and most knowledgeable staff*
- *A 2-year parts warranty*
- *A lifetime labor warranty*
- *A 60-day money-back guarantee*
- *A free year of G.E. on-site service; 2nd year $99!*
- *Lifetime toll-free technical support, 24 hours a day*
- *A personalized tech support card*
- *Free access to the ARES on-line BBS*
- *Free remote diagnostics*
- *Express parts replacement*

SUPER SPEED, SUPER QUALITY, SUPER SERVICE

- *ARES has options galore! Call today for current pricing on big-screen monitors, tape backups, modems, RAM upgrades, CD-ROM drives, sound cards, TrueType font packages and more!*
- *Custom configurations available! Ask about our Ready to Ship systems!*
- *ARES accepts all major credit cards (no surcharges), and ships to APOs!*
- *Ask about our corporate leasing program!*

ADD $50 FOR WINDOWS DYNAMITE VL VIDEO CARD!

1-800-322-3200

Ready to Ship offer applies to orders placed on Monday through Friday only, during non-holiday periods, for delivery within the continental United States only. Special order items covered by manufacturer's warranty and return policies. All shipping, handling and software charges non-refundable. Prices subject to change without notice. Standard return policy begins on date of shipment. All returns must have valid ARES RMA#. All brands and product names are trademarks or registered trademarks of their respective companies. All systems shipped F.O.B. *Based on approved 36-month business leases. Applicable taxes not included.

ARES Microdevelopment, Inc.
"Better than ever."

23660-A Research Drive
Farmington Hills, MI 48335
Local (313)473-0808
Fax (313)473-4450

Bondwell

NEW!

486SX-33

$1,599
4MB RAM
120MB HDD

$1,699
4MB RAM
170MB HDD

486DX-33

$1,899
4MB RAM
120MB HDD

$1,999
4MB RAM
170MB HDD

Since 1975 Bondwell's strengths are derived from front line pioneering in high-tech electronics on worldwide basis. We have specialized in design and manufacturing of notebook and laptop computers for over a decade. Unlike those who just slap their name on the products, we have full control over the design, manufacturing, quality control of our products - that's why we can offer you a combination of price, performance and support that no other manufacturers can match.

SLIM

the most reliable, full-fledged notebook computer that one can find. To give your notebook a classic and elegant touch, we are offering a leather look, soft vinyl-covered casing as an option. Not only will it add class to your notebook computer, it also helps to prevent scratches!

Ranging from the most powerful 486DX with docking unit to the basic 486SLC notebook computers, we have the widest range of powerful notebook computers that you can choose to suit your computing needs. Our 486-based notebook computers come standard with 2 or 4-Megabyte RAM, 80/120/170 or 200-Megabyte of hard drive capacity for your option. A combination of power and thoughtful features that will truly meet your expectation and satisfaction.

POWER

SERVICE

Our engineers and technical experts offer full support for the products. Because we design and manufacture them, you can rely on us for the years you own the product. Our standard support package includes a No Risk 30-Days Money Back Guarantee, Life-Time Toll-Free Technical Support... all of this comes at a very competitive price that is truly affordable to you.

Quality Parts

Bondwell's notebook computers are built with heavy duty usage in mind. They are well-built in aluminum casing which offers excellent protection and durability that you would expect for everyday use. It is one of

CALL NOW!

Call us today, our well-trained customer representatives will gladly assist you in choosing the most suitable notebook computer for your evolving computing needs.

18 YEARS

Call For Special Reseller & Corporate Pricing!

Mon-Fri (PST) 7am-7pm, Sat (PST) 9am-4pm

Beats `Em!

NEW!

Standard Features

- 486SX-33MHz or 486DX-33MHz
- Internal Cache
- 4MB RAM
- 120MB Hard Drive
- 3.5" 1.44MB Floppy Drive
- Backlit 10" VGA 640 X 480 (Mono)
- Dual Scan Color VGA-256 color (Color)
- Simultaneous Display
- Printer Port, Serial Port, VGA Port
- 85-Key Keyboard
- Dual Battery Pack
- 100-240V Power Adapter
- Advanced Power Management Features
- DOS 6.0
- Bundled Carrying Case
- Quick Charge
- Weighs 6.27 Pounds
- Measures 8.6 x 11.7 x 1.95 Inches

Call for latest pricing!

1-800-627-6888

486SXc-33	486DXc-33
$2,199 4MB RAM 120MB HDD	$2,499 4MB RAM 120MB HDD
$2,299 4MB RAM 170MB HDD	$2,599 4MB RAM 170MB HDD

Value

$1,199

Standard Features

- 486SLC-33MHz
- Internal Cache
- 2MB RAM
- 80MB Hard Drive
- 3.5" 1.44MB Ext. Floppy Drive
- Backlit 10" VGA 640 x 480
- Printer, Serial, VGA Port
- 85-Key Keyboard
- 100-240V Power Adapter
- APM Features
- DOS 6.0
- Bundled Carrying Case
- Quick Charge
- 5.2 Pounds
- 8.6 x 11.7 x 1.5 Inches

486NC-33

$1,199 2MB RAM 80MB HDD

$1,399 4MB RAM 120MB HDD

Value

$1,299

Standard Features

- 486SLC-33MHz
- Internal Cache
- 2MB RAM
- 80MB Hard Drive
- 3.5" 1.44MB Floppy Drive
- Backlit 10" VGA 640 x 480
- Printer, Serial, VGA Port
- 85-Key Keyboard
- 100-240V Power Adapter
- APM Features
- DOS 6.0
- Bundled Carrying Case
- Dual Battery Pack
- Quick Charge
- 6.2 Pounds
- 8.6 x 11.7 x 1.95 inches

486NC2-33

$1,299 2MB RAM 80MB HDD

$1,499 4MB RAM 120MB HDD

Last Time Toll-Free Phone Number!

30 DAY MONEY-BACK GUARANTEE

2 YEAR Extended Warranty Available

$399 listed

only $199 of time of system purchase

COMPLETE SYSTEM:
The docking unit comes with VGA, external keyboard, serial, printer ports and room to fit one half-sized AT card. It allows you easy hook up to the other peripherals. Within seconds, you can turn your notebook computer to a full-function PC system.

DOCKING UNIT:
Installation is simple, just insert the notebook computer into the slot and you are ready to go. Our docking unit offers maximum space-saving feature, it occupies only 14.5 x 4.8 inches of your desk space

Special price $49

AN ELEGANT OPTION:
Getting tired of the pinstre look of your notebook computer? We offer you an option to give your notebook a more classic touch. A leather look, soft-vinyl covered notebook computer. Not only does it look good but also helps to prevent scratches.

Accessories Price List:-

B148	Deluxe Carrying Bag, Black Color	$70
B140	7.2V NiCad Battery Pack	$99
B136B	2MB RAM Upgrade Card	$110
B142	4MB RAM Upgrade Card	$220
B130S	6MB RAM Upgrade Card	$330
B129	Additional Ext. FDD Drive	$129
B116	Car/Cigarette Adapter	$79
B152	2400/9600 Data/Fax Modem	$99

* Prices only valid at time of system purchase

Bondwell®

800-627-6888

Circle 132 on reader service card.

Canada: 416-405-0711, Outside USA: 510-490-4300, ext.768

GREAT AS PC & MAC SCREEN SAVERS

COREL PROFESSIONAL PHOTOS CD-ROM

Works with any ISO 9660 CD-ROM drive (XA support not needed)

Royalty Free

Kodak Photo CD Format

PC & Mac Compatible

Ideal for Desktop Publishing

Each collection features 100 razor-sharp Kodak Photo CD format photographs on a single disc. The stand alone Corel utilities included let you turn any of these stunning CD-ROM photo images – or your personal photos on CD – into Screen Savers, Wallpaper and slideshows (with optional background music tracks).

Save time and money on stock photography!

Corel Professional Photos are royalty free for all applications and ready for color separation. There are no additional fees. That makes them ideal for use in any visual communication such as ads, brochures, presentations and multimedia. And you can use CorelDRAW to retouch or add special effects to any Corel Professional Photo.

Already more than 100 titles:

Sunsets & Sunrises • Mountains • WWII Aircraft • Porsche Racing • Coasts • Wild Animals • Sailboats • Birds • Trees & Leaves • Patterns • Underwater Reefs • Arctic • Auto Racing • Bridges • People • Churches • Food • Lakes & Rivers • Waterfalls • Fields • Aviation Photography • Death Valley • Fireworks • North American Wildlife • Predators • Waterfowl • Alaska • Underwater Life • Hawaii • Turkey • Northern California • Apes • California Parks • Cactus Flowers • Butterflies • Mexico City • New Mexico • Korea • Sacred Places • Singapore • Guatemala • Japan • Doors of San Francisco • Air Shows • Flowers • China & Tibet • Africa • Ireland • Arizona Desert • Spirit of Buddha • Commercial Interiors • Egypt • Residential Interiors • Deserts • Plants • Insects • Windsurfing • Swimming • Castles • Cityscapes • Computer Graphics • Couples • Education • Environment • Executives • Fighter Jets • Rowing • Fishing • Glamor • Golf • Health • New Zealand • Skiing in Switzerland • Ski Scenes • Commercial Construction • American National Parks • San Francisco • Faces • Fire Fighting • Western Canada • Plants • Jewelry and many more...

The world's leading photo CD collections from the makers of CorelDRAW, the world's best selling graphics software!

Comprehensive Utilities Included:*

- Corel SCREEN SAVER
- Corel CD-AUDIO
- Corel MOSAIC VISUAL FILE MANAGER
- Corel PHOTO CD LAB PLUS OPTIONAL BACKGROUND MUSIC
- WALLPAPER FLIPPER
- PRINTED PHOTO REFERENCE GUIDE

MPC Multimedia PC

Photo CD

Suggested List Price

$49.95 U.S. Funds

100 SUPERB IMAGES IN EACH COLLECTION!

CALL NOW! EXT. 109

1-800-772-6735

Circle 157 on reader service card.

$ ATTENTION PROFESSIONAL PHOTOGRAPHERS! $

If you are a professional photographer interested in having Corel publish your photographs, please call the number below for more information.

CALL: (613) 728-8200 ext. 5080

*Not all utilities are available for Macintosh. The MPC logo is a certification mark of the Multimedia PC Marketing Council, Inc. The Photo CD symbol and logo are trademarks of Eastman Kodak Company.

KUYR-02022

ELECTRIFIED DISCOUNTERS INC.

Electrified Discounters - The Largest Selling Dealer Of Panasonic Renewed Printers In the USA!!

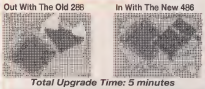
Make Your System Electrified Make Your 286 A 486

Just Pull Out The 286 Chip And Make It A 486-33Mhz - Upgrade

- Least Expensive Way To Upgrade
- Supports Windows Enhanced Mode
- Works With 386 Memory Managers
- Uses Fast Cyrix 486SLC Processor
- Optional Cyrix 387 Coprocessor
- Extend-It-Up To 16MB Memory Cards Available!

$279

Out With The Old 286 — In With The New 486



Total Upgrade Time: 5 minutes

** CD-ROM RIOT **

Magnavox-External CD-ROM

- Model 461 w/CD-ROM Software-6 Titles
- Factory Renewed - 1 Year Warranty
- Up to 700MB, 700MS Access -

$279

Magnavox Computers w/ CD-ROM's

Pro 80CD by Magnavox

- 386SX-20-2MB RAM • 1.44 FD
- 80MB HDD • 3.5" Floppy • Sony CD-ROM
- SVGA Card • 11 CD Titles
  Lotus Software

$849

Pro 64CD by Magnavox

- 386SX-16-1MB RAM • 1.44 FD
- 40MB HDD • 3.5" Floppy • Sony CD-ROM
- SVGA Card - 11 CD Titles
  Lotus Software

$649

** AMAZING ADDITIONS **

Leading Edge Laptop

- 386SX-16 • 100MB Hard Drive • 2 MB of RAM
- 1.44 MB Floppy • 14" x 13" x 3" • 13 lbs.
- Non-Glare Backlit Supertwist LCD Display
- Renewed by Leading Edge
- 90-Day Factory Warranty

$799

9600 Baud Modem

- Patriot • V.32/V.42 Internal • 8-bit • 1/2 Card
- 2-Year Warranty • Brand New
- Fully Hayes Compatible

$119

** LASER LUXURY **

OKIDATA OL400 Laser Printer

- 4ppm • 300dpi • 17 fonts • 512K RAM
- 1-Year Warranty - NEW

$449

SHARP LASERS

- 30 Day Sharp Warranty • New Consumables
- Factory Renewed • Extended Warranties Available

SHARP JX9500H Laser 9 ppm

- 300dpi LASER • 6 Fonts
- 512K RAM • HPII • 5 Emulations

$549

SHARP JX9700 Laser 16 ppm

- 300dpi LASER • 14 Fonts • 1MB RAM
- HPII • Up to 5 Years Extended Warranties
- Call For Details!

$1099

CANON BUBBLE JET 5 PRINTER

Laser Quality, Dot Matrix Price!

- 142cps • 360dpi • Portable Or Desktop Use
- Weighs Just 4 lbs! • Factory Renewed
- 90 Day Warranty • Canon Options
- Same Printer As Canon BJ-10EX
  Lowest Price In the USA!

$169

LOTUS SMARTSUITE V 1.1

Complete Windows Solution!

Includes:

- LOTUS 1-2-3, The World's Most Popular Spreadsheet, v 1.1
- AMI PRO, The Best Wordprocessor For Windows,v 3.0
- FREELANCE GRAPHICS, Presentation Package v 1.1
- LOTUS ORGANIZER, v 1.0
- cc: MAIL For Windows

ADOBE TYPE MANAGER

$219

** SCANNING SCANNERS **

Xerox Datacopy Scanner

- Full Page Flatbed • 256 Shades of Gray
- 300dpi • Up to 8.5" x 14"
- Brand New • Full Warranty

$499

MicroTek TeleScan II Scanner

- Full Page • 64 Shades of Gray • 300dpi
- 50 Page Sheet Feeder • Full Warranty
- Free Fax Board 9600 Baud

$399

Read Right OCR Software $199

Panasonic - Dot Matrix Printers

- Factory Renewed • 2 Year Factory Warranty

KX-P2180 $139

- 9 Pin • Narrow-Carriage • 240 CPS Draft
  9 Fonts • Color Capable

KX-P1123 $159

- 24 Pin • Narrow-Carriage • 240 CPS Draft
  7 Fonts • Rear/Bottom/Top Feeds

KX-P2023 $169

- 24 Pin • Quiet Mode • Narrow-Carriage
  240 CPS • 80 CPS NLQ • 7 Fonts

KX-P2123 $189

- 24 Pin • 240 CPS • Color Capable • Narrow-Carriage
  10 Fonts • Rear/Bottom/Top Feeds

KX-P1124i $219

- 24 Pin • Narrow-Carriage • 300 CPS Draft
  11 Fonts • Front/Rear/Bottom/Top Feeds

KX-P2124 $259

- 24 Pin • 320 CPS • Color Capable • 12 Fonts
  Narrow-Carriage • Front/Rear/Bottom/Top Feeds

KX-P1624 $289

- 24 Pin • Wide-Carriage • 192 CPS Draft
  7 Fonts • Front/Rear/Bottom/Top Feeds

KX-P1695 $299

- 9 Pin • Wide-Carriage • 330 CPS Draft
  8 Fonts • Front/Rear/Bottom/Top Feeds

KX-P2624 $309

- 24 Pin • Wide-Carriage • 300 CPS Draft
  11 Fonts • Front/Rear/Bottom/Top Feeds

KX-P1654 $389

- 24 Pin • Wide-Carriage • 375 CPS Draft
  10 Fonts • Front/Rear/Bottom/Top Feeds

PANASONIC LASER PRINTERS

- Factory Renewed • 1-Year Factory Warranty

KX-P4410-LASER $499

- 5 PPM • 28 Fonts • 300dpi • 512K RAM

KX-P4430-LASER Call

- 5 PPM • 36 Fonts • 300dpi • 1MB RAM

KX-P4450I-LASER $949

- 11 PPM • 28 Fonts • 300dpi • 512K RAM

KX-P4455-Postscript $1489

- 11 PPM • 39 Fonts • 300dpi • 2MB RAM

** MONITOR MANIA **

GOLDSTAR 1490 14" SVGA $389

- .25DP • NI • 1280 x 1024 • 1-Year Warranty

TECO 1422 14" SVGA - NEW $249

- .28DP • NI • 1024 x 768 • 1-Year Warranty

Panasonic C-1381i 14" SVGA $269

- .28DP • 1024 x 768

Panasonic C-1395 14" SVGA $379

- .28DP • NI • 1024 x 768 • 1-Year Warranty

The Goldstar & Panasonic Monitors Are Factory Renewed

All PANASONIC Printers Above Are Factory Renewed — Like New Condition (New Box, Packaging, Ribbon, Manuals) w/Full Factory Warranties
Laser Memory Upgrades — Toners — Cassettes Available — **Quantity Discounts Available — CALL**

30-DAY MONEY BACK GUARANTEE!
Shipping Charges not Refunded

Customer Service & Technical Support: (908) 494-8588
Mon-Fri 9AM-6PM EST
Since 1983

(800) 678-8585

ELECTRIFIED DISCOUNTERS INC.

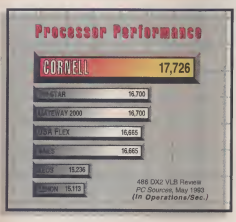
HOURS: Mon-Thurs 9AM-7PM
Fri-Sat: 10AM-6PM
110 Wells Street Hamden, CT 06517
FAX (203) 777-7853

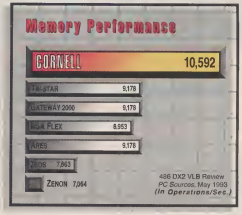
VISA — MASTERCARD — AMERICAN EXPRESS

Leasing Available!
Double Inquiries Invited
Credit Card Cost which is 2 U/20. Not responsible for typographical errors. Prices are subject to change without notice. Quantities are limited. Prices quoted may include freight.

Compare Cornell to Any

See for Yourself — Cornell





INCLUDED WIT

CORNELL

FREE! Three Year Warranty
Three years parts and labor coverage, one year on-site service and a true 30-day money back guarantee – no re-stocking fee!

FREE! WordPerfect 6.0 for Windows
The powerful, easy to use, best-selling word processing software and more!

FREE! Random House Webster's Dictionary & Thesaurus
Instant access to 180,000 words with definitions and 275,000 synonyms!

FREE! Cornell Checkers
Award winning entertainment software, with kid's mode and tournament mode — available only on Cornell PC's!

FREE! Fax/Modem
9600 baud send/receive fax with 2400 baud modem!

FREE! Microsoft Ergonomic Mouse
Sleek style conforms to palm shape for all-day comfort!

Buy Any Cornell PC, Then Choose Any 3 of These Best Selling Applications for only $199.00!

WordPerfect Presentations, WordPerfect Office (single user), WordPerfect Informs, Borland Paradox, Borland Quattro Pro or Norton Desktop for Windows with PFS Window Works!

DIRECT HIT PC Sources

★★★★★
Direct Buyer Systems Specialist Four-Star Rating
–PC Computing, Aug. 1993

WINDOWS NT STATION

- Intel Pentium Ready
- 8 MB RAM, 256K Cache
- Local Bus IDE Controller
- 340 MB 12ms IDE Drive
- 1.2 MB & 1.44 MB Floppy Drive
- Diamond "Viper" VLB Windows Accelerator with 2 MB VRAM
- 15" Flat Screen Non-Interlaced SVGA Monitor, 1024 X 768 at 72Hz
- 101-Key Enhanced Keyboard
- 1 Parallel/2 Serial Ports
- MS-DOS 6.0
- Windows 3.1
- Microsoft Ergonomic Mouse
- WordPerfect for Windows 6.0 Pre-Installed
- Random House Webster's Dictionary Included
- 9600 Baud Fax/ 2400 Baud Modem
- Large Vertical Case with 9 Drive Bays
- 300w Power Supply

486DX/33 **$2499.00**
486DX2/50 **$2619.00**
486DX2/66 **$2729.00**

420 MB Hard Drive Add **$220.00**
17" 1280x1024 NI Monitor Add **$435.00**
14.4 Baud Fax/Modem Add **$150.00**

VALUE PAK

- Intel Pentium Ready
- 8 MB RAM, 128K Cache
- Local Bus IDE Controller
- 250 MB IDE Drive
- 1.2 MB & 1.44 MB Floppy Drive
- Local Bus Windows Accelerated SVGA Card with 1 MB DRAM, Upgradable to 2 MB
- 14" Non-Interlaced SVGA Monitor, .28mm DPI (Edge-to-Edge)
- 101-Key Enhanced Keyboard
- 1 Parallel/2 Serial Ports
- MS-DOS 6.0
- Windows 3.1
- Microsoft Ergonomic Mouse
- WordPerfect for Windows 6.0 Pre-Installed
- 9600 Baud Fax/ 2400 Baud Modem
- Mid-Tower Case with 7 Drive Bays

486SX/33 **$1799.00**
486DX/33 **$1949.00**
486DX2/50 **$2069.00**

15" Flat Screen Monitor Add **$135.00**
DX/33 to DX/40 Add Only **$29.00**

HOME OFFICE PAK

- Intel Pentium Ready
- 4 MB RAM, 128K Cache
- 170 MB IDE Drive
- 1.2 MB & 1.44 MB Floppy Drive
- Local Bus Windows Accelerated SVGA Card with 1 MB DRAM, Upgradable to 2 MB
- 14" Non-Interlaced SVGA Monitor, .28 mm DPI (Edge-to-Edge)
- 101-Key Enhanced Keyboard
- 1 Parallel/2 Serial Ports
- MS-DOS 6.0
- Windows 3.1
- Microsoft Ergonomic Mouse
- WordPerfect for Windows 6.0 Pre-Installed
- Do-It-Yourself Accounting Software
- 9600 Baud Fax/ 2400 Baud Modem
- Desktop Case

FREE! WITH HOME OFFICE PAK!

486SX/33 **$1499.00**
486DX/33 **$1649.00**
486DX2/50 **$1769.00**

250 MB Hard Drive Add **$60.00**
Adlib Sound Card w/Speakers Add **$40.00**

Same day shipping subject to availability and payment approval. Money back guarantee does not include shipping and opened software. The Intel Inside logo is a trademark of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective owners. Prices and configurations are subject to change without notice. WordPerfect software is OEM limited edition materials package.

Other PC in this Magazine

Leaves the Competition in the *Dust!*

CORNELL PCs:

THE COMPETITION
not included
not included
not included
not included
not included
not included

intel inside

Rapid Response

If you don't talk to one of our crew in 90 seconds or less, then we'll throw in a **FREE** surge protector when you buy your system.

Custom Configurations

If you need a customized system *just for you*, we can do it!

Cutting Edge Technology

We offer the fastest Windows accelerators (Diamond, Hercules, Paradise, Cirrus, Logic) to make Windows applications a breeze.

Award Winning Systems

Cornell beat Gateway, Zeos, Tri-Star, Ares and many more for the *PC Sources*, May 1993 Direct Hit Award! for our Power Pak 486DX2/66.

Same Day Shipping

With the configurations you see advertised, we can ship the same day if you order by noon PST.

The Winning Formula

CORNELL

COMPUTER SYSTEMS™

800-886-8999

YOUR UNLIMITED PARTNER

CORNELL COMPUTER SYSTEMS

20519 Walnut Drive, Walnut, CA 91789

Technical Support 800-886-7279

909-594-5848 • Fax 909-594-9995

Monday - Friday, 6:00 a.m. to 7:00 p.m. PST

Saturday, 9:00 a.m. to 4:00 p.m. PST

¿Habla Español? Llame Morris en ext. #209

Cornell Computer is not responsible for typographical errors or incorrect artwork. Cornell Computer reserves the right to correct errors at time of purchase

Circle 250 on reader service card.

THE CHOICE

What system is the fastest? The most reliable? What kind of service am I getting? Just how do I make the right

MultiMedia

100% MPC Compliance For 100% Media Enjoyment.

CD-ROM technology can now bring your computer to life with breathtaking sound, color and video.

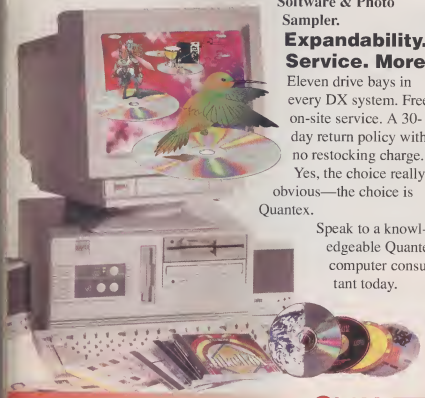
Quantex offers lightning-fast 32-bit local bus video, 16.7 million true colors plus a Sound Blaster Pro™ compatible card with digital-ready speakers.

What's more, our system is Kodak photo CD compatible and complies 100% with today's MPC standard.

Five CD-Titles. Great Value.

Ever wonder why Penguins can't fly? Want to teach your children how to count? How about flying a F-14 Tomcat on a do-or-die mission? Get all this and more with the six CD-ROM titles included in every Multimedia system:

Dictionary of the Living World, Compton's Family Choice, Compton's Interactive Encyclopedia, USA Today: *The 90's Volume,* and Kodak Photo-CD Access Software & Photo Sampler.



Expandability. Service. More.

Eleven drive bays in every DX system. Free on-site service. A 30-day return policy with no restocking charge.

Yes, the choice really is obvious—the choice is Quantex.

Speak to a knowledgeable Quantex computer consultant today.

Multimedia VESA Systems

Q486SX/25MM $1445

- **Kodak™ Photo CD compatible High performance CD-ROM drive**
- **SoundBlaster Pro™ compatible audio card**
- **Digital ready amplified stereo speakers**
- **Five CD-ROM titles**
- Intel 486™SX-25 MHz upgradable CPU
- 4MB RAM expandable to 32MB
- 255MB Western Digital™ hard drive
- 32-bit VL-BUS graphics card
- 14" 1024x768 non-interlaced monitor
- 1.44MB floppy drives
- Baby AT desktop case
- 101 Key enhanced keyboard
- High resolution mouse
- Microsoft DOS 6.0 and Windows 3.1
- Same Day shipping available

Q486DX/33MM $1695
Q486DX2/50MM $1745

Q486DX/33MM $1995

- **Kodak™ Photo CD compatible High performance CD-ROM drive**
- **16-bit SoundBlaster Pro™ compatible audio card**
- **Digital ready amplified stereo speakers**
- **Five CD-ROM titles**
- Intel 486™DX-33 MHz upgradable CPU
- 8MB RAM expandable to 32MB
- 128K ultra-fast cache
- 340MB Western Digital™ hard drive with
- 32-bit VL-BUS graphics card
- 14" flat screen 1024x768 color monitor
- 1.44MB floppy drives
- 11 bay tower case
- 101 Key enhanced keyboard
- High resolution mouse
- Microsoft DOS 6.0 and Windows 3.1

Q486DX2/50MM $2045
Q486DX2/66MM $2195

All Systems Include:

- One-Year Warranty On Parts & Labor
- Express Parts Replacement
- One-Year On-Site Service
- Lifetime Toll-Free Tech Support
- 30-Day Money Back Guarantee

QUANTEX
Microsystems, Inc.

Two Tower Center Blvd., East Brunswick, NJ 08816, Tel (908) 563-4166, Fax (908) 563-0407

Quantex accepts prepaid checks, Visa, MasterCard, Discover, and Amex. Purchase orders from government agencies, universities, and Fortune 1000 companies also accepted. On-Site Service may not be available in certain remote areas. All returned items must have a Return Merchandise Authorization (RMA) number and must be in original packaging. The cost for returned freight is not included with any Money-Back

IS OBVIOUS

decision? We say look at the facts. Because once you look at the facts your choice will be obvious. Quantex.

Windows Workstations

Not Just VESA. But Dual VESA.

While most companies give you local bus video alone, Quantex gives you VESA local bus video plus local bus IDE. And because VESA local bus is now an industry standard, compatibility issues are eliminated. Future upgrades are no longer a problem.

Local Bus Video. 800% faster than ISA.

32-bit local bus video means the end of the 16-bit bottleneck. So you get speeds up to 800% faster. And our local bus video is *true color* video. So forget about 32,000 colors, and get ready for a new world of 16.7 million colors!

Local Bus IDE. Put Your Hard Drive in OverDrive.

Our local bus controller can do for your hard drive speed what our local bus video can do for your video. The driving force is a true 32-bit local bus IDE interface. You'll get lightening-fast data transfer rates with maximum bursts of 8.3 MB/sec.

intel inside

A Cut Above the Rest ... Caviar WESTERN DIGITAL

QUOVEX Master Card VISA

Windows Workstations

Q486DX/33VLB $1445

- **32-bit VL-BUS IDE controller**
- **32-bit VL-BUS graphics accelerator card with 1MB supports 16.7 million colors**
- Intel 486™DX-33 MHz upgradable CPU
- 4MB RAM expandable to 32MB
- 128K ultra-fast cache
- 255MB Western Digital™ hard drive
- 14" 1024x768 non-interlaced color monitor with edge-to-edge display and .28mm dot pitch
- 1.2MB and 1.44MB floppy drives
- 2 serial, 1 parallel, 1 game port
- 11 bay tower case
- 101 Key enhanced keyboard
- High resolution mouse
- Microsoft DOS 6.0 and Windows 3.1
- Same Day shipping available

Q486SX/25/VLB $1195
Q486DX2/50VLB $1495
Q486DX2/66VLB $1645

Q486DX2/66VLB $1995

- **32-bit VL-BUS IDE controller**
- **32-bit VL-BUS graphics accelerator card with 1MB supports 16.7 million colors**
- Intel 486™DX2-66MHz CPU
- 8MB RAM expandable to 32MB
- 128K ultra-fast cache
- 340MB
- 15" flat screen 1024x768 color monitor
- 1.2MB and 1.44MB floppy drives
- 2 serial, 1 parallel, 1 game port
- 11 bay tower case
- 101 Key enhanced keyboard
- High resolution mouse
- Microsoft DOS 6.0 and Windows 3.1
- Same Day shipping available

Q486DX/33VLB $1795
Q486DX2/50VLB $1845

All Systems Include:

- One-Year Warranty On Parts & Labor
- Express Parts Replacement
- One Year On-Site Service
- Lifetime Toll-Free Tech Support
- 30-Day Money Back Guarantee

1-800-288-0566

Guarantees, shipping charges are non-refundable. Prices and product descriptions subject to change without notice. Same day shipping subject to availability. Quantex Microsystems cannot be responsible for errors in typography or photography. The Intel Inside Logo is a trademark of Intel Corporation. Some of the names or trademarks shown herein may be the property of other companies. Screen image simulated.

Circle 222 on reader service card.

AUTOMATE OR EVAPORATE

You can't afford not to computerize!

" I ran out of lemonade and I don't know where my money went. "

Join the thousands of growing businesses nationwide who have embraced the MicroBiz Business Computer solutions. Over 100,000 enterprises have purchased this affordable and beginner-proof solution to invoicing, customer tracking and inventory control. Merges with all popular accounting packages. This software is not only easy to use, but the dBase file format it uses is very flexible. You can easily create your own special, customized reports, in addition to the hundreds of reports the system already generates. Nationwide network of factory trained authorized resellers. *Call today for a demonstration and a reseller near you.*

Business Solutions for Video Stores, Liquor Stores, Retail Stores, Hair & Nail Salons, Rental Stores, Auto Repair Shops, Dry Cleaning Stores and Your Business!

- Point & Shoot customer and inventory lookup
- Credit card authorization option
- Bar code compatibility
- Color/size matrix
- Multiple pricing levels
- Track inventory by size/color/style
- Mailing labels
- Track customer history
- Daily closeout reports
- Accepts split tender
- Pull down menus
- Pop-up windows
- 99 levels of password protection
- Tracks promotional sales
- Reorder reports
- Extensive sales reports
- Item/invoice discounts
- Tracks sales by employees
- Set limited-time promos
- View in-stock status
- Links to all popular Accounting packages
- Receiving reports
- Pop-up calculator
- Works on any IBM PC or compatible with hard disk drive
- Multi-user version and source code available
- dBase compatible
- Compiled with Clipper
- 220 Volt Hardware Available
- Foreign Languages Available

Call today to find out how you can automate your business!

MicroBiz
AUTOMATE YOUR BUSINESS

500 Airport Executive Park ◆ Spring Valley, NY 10977
Sales: 800-496-6789 ◆ Main Phone: 914-425-9500 ◆ Fax: 914-425-4598
Fax on demand: 914-426-6064 ◆ 24 Hr. Bulletin Board Service: 914-425-6440

Circle 109 on reader service card.

Call MicroBiz today
FREE
CATALOG & VIDEO
800-496-6789

HARD DRIVES MEMORY SUPER SOURCE

LIFETIME* WARRANTY 100% GUARANTEED

EXTENAL DRIVES ADD $149

Quantum

FACTORY NEW 2 YEAR WARRANTY

FUJITSU

Maxtor

TOSHIBA

MICROPOLIS

Seagate

WESTERN DIGITAL

CONNER

FACTORY NEW 1 YEAR WARRANTY

IDE			
85MB CP30084E	17MS	3.5X1	$184
120MB CP30104H	19MS	3.5X1	199
170MB CP30174E	17MS	3.5X1	199
210MB CP30204	16MS	3.5X1	214
250MB CP30254H	16MS	3.5"	299
340MB CP30344	14MS	3.5X1	790
520MB CP30544	10MS	3.5X1	820
SCSI			
85MB CP30080E	17MS	3.5X1	171
170MB CP30170E	17MS	3.5X1	699
212MB CP30200	16MS	3.5X1	790
520MB CP3540 SCSI-2	10MS	3.3	87E
1.3GB CP31370 SCSI-2	10MS	3.5	1000

INTEL CPUs

386 DX	
80386 DX/20	30
80386 DX/25	74
80386 DX/33	80
AMD 0Z40	90
486DX/SX	
80486 DX/25	290
80486 DX33	309
80486 DXI50	406
80486 DX-2/50	478
80486 DX-2/66	509
80486 SX/25	179
80486 SX/20	149
80486 SX/33	249

DYNAMIC RAMS

1MB X 1-100NS	CALL
1MB X 1 80NS	CALL
1MB X 1 70NS	CALL
1MB X 1-60NS	CALL
256K X 1 150NS	CALL
256K X 1 120NS	CALL
256K X 1 100NS	CALL
1 x 4-80NS DIPP	CALL
256 X 1 80NS	CALL
256K X 1 70NS	CALL
256K X 1-60 NS	CALL
256K X 4-100NS	CALL
256K X 4-80NS	CALL
256K X 4 70NS	CALL
256K X 4-60NS	CALL
64K X 4 120NS	CALL
64K X 4-100NS	CALL
64K X 4-80NS	CALL
64K X 1-150NS	CALL
64K X 1-120NS	CALL
64K X 1 100NS	CALL

CACHE

8 K 8-15	5.00
32 X 8-15	16.00
8 X 8-25	4.00
32 X 8 25	7.00
64 X 4-25	8.00
16 X 4-25	8.00
8 X 8 20	4.00
32 X 8 20	8.00
64 X 4 20	18.00
16 X 4-20	5.50
16 X 4-15	8.00
64 X 1 20	18.00
64 X 1 15	38.00

MATH CO-PROCESSORS

INTEL	
8087 5MHZ INTEL	40.00
8087 2 8MHZ INTEL	130.00
8087 1 10MHZ INTEL	80.00
80287-6 6MHZ INTEL	80.00
80287-8 8MHZ INTEL	80.00
80287 10 10MHZ INTEL	80.00
80387XL 10MHZ INTEL	75.00
80287XLT 10MHZ INTEL	75.00
80387SX 16 16MHZ INTEL	75.00
80387SX 20 20HZ INTEL	75.00
80387SX 25 25HZ INTEL	75.00
80387DX 16 16MHZ INTEL	75.00
80387DX-20 20MHZ INTEL	75.00
80387DX 25 25MHZ INTEL	75.00
80387DX 33 33MHZ INTEL	75.00
80487SX 25 INTEL	375.00
OVERDRIVE SX/DX33	CALL
OVERDRIVE SX-DX25	CALL
OVERDRIVE SX-DX20	CALL
RAPID CAD	CALL
CYRIX	
83D87DX 16 16MHZ CYRIX	75.00
83D87DX 20 20MHZ CYRIX	75.00
83D87DX 25 25MHZ CYRIX	75.00
3D87DX 33 33MHZ CYRIX	75.00
83D87DX-40 40MHZ CYRIX	85.00
83S87SX16 16MHZ CYRIX	80.00
83S87SX20 20MHZ CYRIX	80.00
83S87SX25 25MHZ CYRIX	80.00
82S87XL CYRIX	85.00
WEITEK	
3167 20MHZ WEITEK	295.00
3167 25MHZ WEITEK	385.00
3167 33MHZ WEITEK	485.00
4167 25MHZ WEITEK	445.00
4167 33MHZ WEITEK	385.00
IIT	
2C87-8 8MHZ IIT	50.00
2C87 10 10MHZ IIT	54.00
2C87 12 12MHZ IIT	80.00
2C87 20 20MHZ IIT	50.00
3C87 16 16MHZ IIT	80.00
3C87 20 20MHZ IIT	85.00
3C87 25 25MHZ IIT	60.00
3C87 33 33MHZ IIT	89.00
3C87-40 40MHZ IIT	10.00
3S87SX 16 16MHZ IIT	85.00
3S87SX-20 20MHZ IIT	85.00
3S87SX-25 25MHZ IIT	85.00
3S87SX-33 33MHZ IIT	85.00

MOTHER BOARDS

386DX-33-64K CACHE W/CPU	$199
386DX-33-256K CACHE W/CPU	248
386DX-40-64K CACHE W/CPU	218
386DX-40-256K CACHE W/CPU	299
486SX-25-64K CACHE W/CPU	348
486DX-33-64K CACHE W/CPU	498
486DX-33-256K CACHE W/CPU	548
486DX-50-256K CACHE W/CPU	748

PROCESSOR UPGRADES

Kingston 386 & 486

Now you can use WINDOWS in enhanced mode get true multitasking & background operation for WINDOWS 3.1, OS/2 & other 386 specific hardware. Processor upgrades offer dramatically increased system performance by up to 350% & easy installation

SX NOW! supports IBM AT and others into a 386	
25MHZ	198
33MHZ	218
SLC NOW! supports 286 PS/2, 50,50Z & 60 into a 486	
20MHZ	139
25MHZ	228
50MHZ	398
486 NOW! supports PS/2, 70, 80 & COMPAQ into 486	
DX33MHZ	638
SX25MHZ	428
MicroMaster supports all MCA PS/2 into a 486(0-16MB memory)	
486DX33	1295
486SX25	828
AT Master supports 386SX systems from IBM & COMPAQ (0-16MB)	
486DX33	1309
486SX25	909

PS/2 HARD DRIVES

PS/2 50, 50Z, 55SX, 60, 70, 80, P70

INTERNAL DRIVE KITS - May be used as a high performance replacement or to co-exist with the original IBM drive. Compatible with DOS 3.3, 4.01, 5.0, OS/2, 2.0 and Novell. Includes IDE or SCSI-2 micro-channel controller, hard drive, mounting kit, ribbon and power cable, manual, and hardware

106MB 15MS IDE	383
125MB 15MS IDE	414
125MB 15MS SCSI	439
200MB 15MS IDE	453
200MB 15MS SCSI	513
340MB 13MS IDE	589
340MB 13MS SCSI	869
512MB 12MS IDE	1043
512MB 12MS SCSI	1284
1.2GB 12MS SCSI	1443

PS/2 MODEL 25, 30, 30-286

INTERNAL DRIVE KITS Includes controller, drive, mounting kit, cables and hardware. Supports DOS 5.0 Windows 3.1

42MB HARD DRIVE KIT	189
106MB HARD DRIVE KIT	253
125MB HARD DRIVE KIT	284
200MB HARD DRIVE KIT	323

MICROCHANNEL CONTROLLER

IDE	169
SCSI-2	179

IDE CONTROLLER supports all internal IDE drives. Zero slot installation for model 50 & 50Z

SCSI 2 CONTROLLER supports 7 internal or external SCSI drives, CD Roms & Tape Backups, with 7 year warranty! Both support DOS 5.0 Windows & OS/2, compatible with existing IBM drive and controllers

IBM

TI

AST

NEC

ZENITH

SUN

Apple

hp

COMPAQ

TOSHIBA

EPSON

DELL

EVEREX

AT&T

SILICON GRAPHICS

Panasonic

ALR

CANON

ACER

MAGNAVOX

PRINTER MEMORY

LAPTOP & NOTEBOOK

BROTHER

QMS

SHARP

OKIDATA

1 X 9 $CALL
70 NS SIMMS
4 X 9 $CALL

CALL FOR LATEST PRICES

SIMM-SIPP MODULES

4MB X 9-80NS SIMM-PC	CALL	256K X 9-100NS SIMM	CALL	1MB X 9-70NS SIPP	CALL
4MB X 9-70NS SIMM	CALL	256K X 9-80NS SIMM	CALL	1MB X 9-60NS SIPP	CALL
4MB X 9-60NS SIMM	CALL	256K X 9-70NS SIMM	CALL	256K X 9-100NS SIPP	CALL
1MB X 9-100NS 9 CHIP SIMM	CALL	256K X 9-60NS SIMM	CALL	256K X 9-80NS SIPP	CALL
1MB X 9-80NS 3 CHIP SIMM	CALL	1MB X 8-80NS SIMM	CALL	256K X 9-70NS SIPP	CALL
1MB X 9-80NS 9 CHIP SIMM	CALL	1MB X 8-70NS SIMM	CALL	256K X 9-60NS SIPP	CALL
1MB X 9-70NS 3 CHIP SIMM	CALL	4MB X 8-80NS SIMM	CALL	256 X 36 - 1MB	CALL
1MB X 9-70NS 9 CHIP SIMM	CALL	4MB X 8-70NS SIMM	CALL	512 X 36 - 2MB	CALL
1MB X 9-60NS 3 CHIP SIMM	CALL	1MB X 9-100NS SIPP	CALL	1 X 36 - 4MB	CALL
1MB X 9-60NS 9 CHIP SIMM	CALL	1MB X 9-80NS SIPP	CALL	2 X 36 - 8MB	CALL
1MB X 9-53NS 3 CHIP SIMM	CALL			4 X 36 - 16MB	CALL
1MB X 9-53NS 9 CHIP SIMM	CALL				
16MB X 9-70NS SIMM	CALL				

Call for LATEST SUPER PRICES

WE SHIP WITHIN 48 HOURS

FOR MEMORY PRODUCTS NOT LISTED, CALL FOR PRICES AND AVAILABILITY

TECHNICAL SUPPORT	ORDERS ONLY TOLL FREE	FAX
1-215-922-4640	1-600-457-6937	1-215-922-0116

PURCHASE ORDERS FROM GOVERNMENT AGENCIIES – UNIVERSITIES – FORTUNE 2000 FIRMS – CALL 1-800-MEMORY-2 (636679)

ORDER TOLL FREE FROM ANYWHERE IN THE USA OR CANADA. CALL FOR CURRENT PRICES AND VOLUME DISCOUNTS. PRICES AND AVAILABILITY SUBJECT TO CHANGE. ORDER LINES OPEN 8 DAYS. MINIMUM ORDER 50.00 • USA SHIPPING AND HANDLING AIR $12.00–AIR OVERNIGHT $18.00–COD ADD $4.00 • PA RESIDENTS ADD 7% SALES TAX • PREPAID ORDERS CALL FOR CONFIRMATION • ALL RETURNS REQUIRE RMA# AND ORIGINAL INVOICE. CANCELLED ORDERS AND RETURNS FOR CREDIT SUBJECT TO 25% RESTOCKING CHARGE • RETURNED MERCHANDISE MUST BE IN NEW CONDITION AND RECEIVED WITHIN 14 DAYS FROM INVOICE DATE. SORRY, NO REFUNDS AFTER 14 DAYS. SHIPPING AND HANDLING CHARGES NOT REFUNDABLE • INTERNATIONAL ORDERS WELCOME–APO–FPO ORDERS WELCOME. P.O.S ACCEPTED FROM GOVERNMENT AGENCIES/UNIVERSITIES/FORTUNE 2000 COMPANIES – SUBJECT TO APPROVAL. ALL MEMORY PRODUCTS ARE THIRD PARTY. ALL TRADEMARKS ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS. * ALL WORLDWIDE TECHNOLOGIES PRODUCTS ARE 100% GUARANTEED AND COME WITH LIFETIME WARRANTY EXCEPT 90 DAY WARRANTY ON CPU CHIPS AND 1 YEAR WARRANTY ON MOTHER BOARDS *

WORLDWIDE TECHNOLOGIES

437 Chestnut Street, Philadelphia, PA 19106
Customer Service 215-922-4640

Circle 251 on reader service card.

MEMORY MEMORY MEMORY

PERSONAL COMPUTER MEMORY

IBM

AMIBRA Enterprise 386, Hurdle 386, Sprinta 386 (all models)
2MB N/A ..... $119 8MB N/A $489
AMIBRA Enterprise 486, Hurdle 486, Sprinta 486 (all models)
4MB N/A ..... $229 16MB N/A $889
PS/1 386, 386SX
2MB 1397895X ..... $99 4MB 9296944 ..... $199
PS/1 Consultant, Essential, Expert models x43, x44,
PS/1Videopak all models except x43 series
4MB 9697890 ..... $399 16MB 9697891 ..... $829
PS/1 Consultant, Essential, Expert models x76
4MB 8 ..... 9697891 ..... $829
PS/2 25/286, 30/286, memory adapter 1497259
2MB 8 ..... 3015362 ..... $109
PS/2 35SLX, 40SLX, 50Z, 55SLX, 55LX, 65LX, 70, Aftertow
1MB 6450602 ..... $59 2MB 6450604 ..... $119
PS/2 70-A21; A61; B21; B61, PS/1 Consultant, Essential,
Expert models x11, x13, x14, PS/Videopak Cx series
2MB 6450608 ..... $179
PS/2 35SLX, 40SLX, 55SLX, 65SLX, 75, Aftertow, PS/1
Videopak Cx series, adapter board 2473011 or 3473027
4MB 2492933 or 0399977 ..... $229
PS/2 35SLX, 40SLX, PS/1Videopak Cx series
8MB 4455133 ..... $439
PS/2 70 XP, 95 XP, 95 Upstairs, 56, 57 Left, PS/1 Pro M2133
2MB 6450902 ..... $119
PS/2 90 XP, 95 XP, PS/1 Upstairs, 56, 57 Left,
PS/1 Consultant, Essential, Expert models x11, x13, x14,
PS/1 Pro M2133
4MB 6450139 ..... $229 8MB 6450180 ..... $459
Expansion boards for 50, 50Z, 55SLX, and 65SX
2 MB w/2MB 1497259 ..... $219
Expansion boards for all models 70, 80
4 16MB w/4MB 3473011 ..... $549

Dell

Power Desktop 325D, P, 333D, 333P, 433D, 466D, 466D
1MB 310-5501 ..... $59 4MB 310-5507 ..... $229
PowerLine Workstation 420; 425; 433; 450; 450DE/2, 466DE
2MB 310-7466 ..... $119 8MB 310-5468 ..... $499
PowerLine Workstation 420; 425; 433; 450; 450DE/2, 466DE
32MB Kit 310-7639 ..... $1369
Performance 1, L, M series
4MB 310-3335 ..... $259 16MB 310-3337 ..... $989
Performance 486 series
4MB 310-3334 ..... $259 8MB 310-3335 ..... $549

Zenith

Z-300/400 Series Z-420/SX, Z-425/SX, Z-433/SX, Z-433/SX
8MB NE-150 ..... $259 16MB NE-90 ..... $589
Z-Server 425SE, 433DE, 450DE
8MB NE-452 ..... $259 8MB NE-132 ..... $649
Z-Station 3230/SX,4220SX/SX,4225SX,4230SX/SX,4233SX
8MB NE-70 ..... $249 8MB NE-100 ..... $529
Zenith Z-386/20; 25; 33, 33X
1MB ZA386DMC ..... $69 4MB ZA386DMC $229
Zenith Z-386SX/20, 286LPx, Z-415
2MB Kit Z-415-1 ..... $139
Zenith 486/33MT; 25E
4MB ZA4300M2 ..... $229 16MB ZA4300M2 ..... $589

AST

Premmia
4MB 58119-001 ..... $229 8MB 58119-002 ..... $549
Manhattan SNP
16MB 50114-001 ..... $899
Bravo 3/25e
2MB 50070-004 ..... $119 8MB 50070-002 ..... $419
Advantage! 386SX/20; 25, Advantage! Pro 5X/25, Bravo 3/33e
2MB 50096-001 ..... $149 8MB 50096-002 ..... $549
Advantage! Pro 486DX/33; 5X/25, Bravo LC4/25e; 33; 33e; 50e; 4/66d
2MB 50098-002 ..... $119 4MB 50098-002 ..... $229
Premium Powerplus 286/20; 33; 33T, Premmia 3 386SX/16; 20; 25
2MB 50070-002 ..... $69
Advantage! 486/25; 33; 33e; 50T50, Bravo 4/33; 4/33e/25
Premium 4/25; 33T50, Server SE 4/33
2MB 50096-001 ..... $149 8MB 50096-002 ..... $549
Advantage! 486/25; 33; 33e; 50T50, Pro Premium 3/25; 4/33, 33; 50d; 50d4, Premmia 386/20; 25; 33; 40d/25; 33; 33d; 33d4, Premmia 386/25; 33; 40d/33, 40d5X/20, Premium Server SE 4/33
4MB 50070-004 ..... $229 8MB 50070-001 ..... $449

Compaq

Prolinea 3/25s; 3/25sx
2MB 14139-001 ..... $139 8MB 14174X-001 ..... $389
Prolinea 4/25s, 4/33, 4/50
2MB 14140X-001 ..... $69 2MB 14140A-001 ..... $129
4MB 14140A-001 ..... $259 8MB 14140B-001 ..... $519
DeskPro 386/20, 25s, 25
4MB 11232-001 ..... $119 4MB 11234-001 ..... $389
DeskPro 386s/16
4MB 11253A-001 ..... $229 4MB 11263A-001 ..... $399
DeskPro/25 33 4/25S; 5/4; 4/66, 386N; 386M; 386SX/20
2MB, System/Pro LT Series, Portable 486s, 486s
1MB 11860B-001 ..... $89 2MB 11860B-001 ..... $119
4MB 11860B-001 ..... $249 8MB 11860B-001 ..... $549
ProSignia PC Server 486/33; 0ZE/66
1MB 19920B-001 ..... $299 2MB 19914F-001 ..... $399
DeskPro 386-33, 486-33, SystemPro
2MB 11514A-001 ..... $109 8MB 11656A-001 ..... $449

Hewlett-Packard

Vectra QS/16S; 20PC, RS/20; 20C; 25; 25C
4MB Kit ..... 01545A $279
Vectra 386/16N, 386/20N, 386/25N PC
2MB 0245A ..... $139 8MB 0245A $449
Vectra 486PC; 25T; 33T; 486/20; 4/25N; 33N; 50N; 66N
2MB 0283A ..... $119 8MB 0283A $449
Vectra 386/25; 486/25N; 486/33N; 486/50N; 486/66N
2MB 0283A ..... $119 8MB 0283A $449
Vectra 486/25N; 486/33N; 486/50N; 486/66N
16MB 0264A $979
Vectra 386/33N; 33N1
2MB 0271A ..... $139 8MB 0271A $449

NEC

Innovy 425, 433, 466
4MB 1D-1002 ..... $259 16MB 41D-1003 ..... $979
Ready 425, 433
4MB N/A ..... $259 16MB N/A $979
PowerMate 286/12; SX/16, SX/20
2MB Kit EP-4110-8103 ..... $139
PowerMate SX/20
2MB EPS Upgrade EP-4110-8101 ..... $189
2MB Kit Board EP-4113-8102-8103 ..... $249
PowerMate 386/33D Express Fa, a series
4MB EP-4110-4205 ..... $259 16MB EP-4110-4206 ..... $979

FAX MODEMS

For Apple, AST, Compaq, IBM, Sharp, TI, Toshiba, Zenith, and many other Laptop and Notebook Systems.

PCMCIA 2.0 Internal FAX/Modem with XJACK
14.400bps FAX/Modem $429
24/9600bps FAX/Modem $589
Internal FAX/Modem w/MNP-5 & V.42/V.42bis
14.400bps FAX/Modem $419
24/9600bps FAX/Modem $589
External Pocket Modems for any RS-232 Serial Port
14.400bps FAX/Modem $385
96/9600bps FAX/Modem $319

COMPUTER PERIPHERALS INC.

VVo Internal Modems
14.400bps V.32/V.42 modem, send & receive FAX $199
24/9600bps with send/receive FAX $349

VVo External Modems
14.400bps V.32/V.42 modem, send & receive FAX $219
24/9600bps with send/receive FAX $399

PS/2 DATACARD

Kingston

DataCard Micro Channel Storage and Memory Upgrade is available with 0S, 1S7 or 2S9MB of Insertable 16 nsBuscard access storage plus four SIMM sockets that accomodate up to 64MB of system RAM

16-bit or 32-bit DataCard

8.5MB DataCard with DOS RAM $429
127MB DataCard with OS RAM $549
209MB DataCard with OS RAM $749

WE STOCK MEMORY UPGRADES FOR OVER 1700 COMPUTERS AND PRINTERS

CALL FOR ANY MEMORY UPGRADE NOT LISTED!

CPU UPGRADES

Kingston TECHNOLOGY CORPORATION

Upgrade your system to 386 or 486 power!
the Windows 3x enhanced mode, get true multitasking and background operation for Windows 3.1, OS/2, and other 386 specific software, improve your system's performance by up to 350%.

SX/Metal 386 CPU Upgrade
25MHz SX1 ..... $169 33MHz SX1 ..... $199
SX/C/Metal 486 CPU Upgrade
25MHz SX1C ..... $219 50MHz SX1C $349
486/Metal 486 CPU Upgrade
25MHz 1X1 ..... $279 33MHz 1X1 ..... $579
MCMaster 486 CPU Upgrade
25MHz 1X1 ..... $699 With 4MB add $259
33MHz 1X1 ..... $959 With 8MB add $539

SIMM'S

1MB x 9 70/80ns ..... $59 4MB x 9 70/80ns $159
512K x 36 70/80 ..... $89 1MB x 36-70/80 ..... $159
2MB x 36 70/80 ..... $429 4MB x 36-70/80 ..... $789

LASER MEMORY

HP LaserJet IIIsi, 4, 4M, 4SI, 4SiMX, 33MHz, 33MHz, Jetdirect 600
4MB C3964A ..... $259 8MB C3964A $519
HP LaserJet IIP, III, IIIP, IIID
2MB 33471A ..... $189 4MB 33471B $349
HP LaserJet II & IID
2MB 33414A ..... $129 4MB 33414SA $219
IBM Laser 4029 all models
2MB 1183339 ..... $149 4MB 1183325 ..... $349
Canon LBP-4, 4Lite, 4Plus
1MB 563-2520 ..... $129 2MB N/A $179
Canon LBP-III & IIIP Plus
2MB 563-2550 ..... $179 8MB 563-2560 ..... $299
Panasonic 6410 & 4430
2MB KX-P4411 ..... $149 4MB N/A $229
Panasonic 6410A & 4420
2MB KX-P4411 ..... $149 4MB N/A $229
OkiLaser 400
1MB 70014101 ..... $89 2MB N/A $139
Texas Instruments MicroLaser and 35
1MB 2555739-001 ..... $59 4MB 2560052-002 ..... $79
Epson EPL-6000
2MB 1074001 ..... $139 4MB N/A $279
Epson ActionLaser II, EPL-8000
2MB N/A ..... $139 4MB N/A $229

MONEY BACK 30 DAY GUARANTEE

WE SET THE STANDARD:
- 100% COMPATIBLE IN FORM, FIT, AND FUNCTION
- ALL PRODUCTS USER INSTALLABLE
- INSTALLATION INSTRUCTIONS INCLUDED
- TOLL-FREE TECHNICAL SUPPORT
- MANUFACTURER'S WARRANTIES
- CORPORATE PO'S, APO/FPO'S WELCOME
- GOVERNMENT AND EDUCATIONAL PRICING
- INTERNATIONAL ORDERS WELCOME
- SPECIAL VOLUME PRICING
- SAME DAY SHIPPING
- OVERNIGHT DELIVERY AVAILABLE
- VISA, MASTERCARD, AMERICAN EXPRESS, AND DISCOVER ACCEPTED
NO SURCHARGE ON CREDIT CARDS
DON'T SETTLE FOR LESS!

TOLL FREE FROM USA & CANADA
800-429-9866
INTERNATIONAL
714-448-7750
FACSIMILE
714-448-7760

Business Hours:
Monday - Friday, 8am-5pm, P.S.T.
Saturday, 9am-3pm, Orders Only

Mail or fax orders to:
First Source International, Inc.
7 Journey
Aliso Viejo, CA 92656

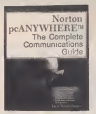
Terms and Conditions: Memory products are fully compatible as specified by their manufacturers. Compatibility changes are unavoidable. A $50 return is required for all returns. All non defective returns, unopened, unused or damaged, will be charged a restocking fee of 15%. Prices, specifications, and availability are subject to change without notice. Purchase prices at the time of order are final. Not liquid. Errors in typography or photography. We will beat any advertised price which only can be checked by mail, offer not good for DEALERS or OEMS. Trademarks and registered trademarks are of their respective companies.

CALL THE UPGRADE EXPERTS 800-429-9866

D1193

3922P $16.95

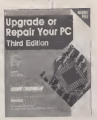
3755P $22.95
Softcover



4175P $19.95

3769H $31.95
Hardcover

881764P $19.95

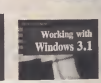


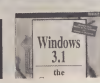
4269H $29.95
Hardcover

881731P $19.95

881670P-XX $29.95
Counts as 2

881654P $29.95





Select any 5 books for only $4.95 (Values to $179.70)

plus 1 BOOK FREE

when you join **The Computer Book Club®**

881869P-XX $27.95
Counts as 2

8818265P $27.95

Get 5 Books for only $4.95

plus 1 book FREE upon prepayment

when you join *The Computer Book Club®*

YES! Rush me the following titles, billing me just $4.95 (plus shipping/handling & sales tax). Enroll me as a member of **The Computer Book Club** according to the terms outlined in this ad. If not satisfied, I may return the books within 10 days for a full refund and my membership will be cancelled. I agree to purchase just 3 more selections at regular Club prices during the next 2 years and may resign anytime thereafter.

Code #'s of my books for $4.95

If you select a book that counts as 2 choices, write the book number in one box and XX in the next.

☐ Bill me (FREE book not available with this payment option.)

SPECIAL OFFER: **Prepay your order by check, money order, or credit card and receive a 6th book of your choice FREE.**

☐ YES! I want the FREE BOOK indicated below. My introductory payment of $4.95 plus $4.95 shipping/handling* and applicable sales tax is enclosed. **Code # of my FREE book:** SINGLE SELECTION ONLY

☐ Check or money order enclosed made payable to: McGraw-Hill, Inc.

☐ Charge my: ☐ VISA ☐ MasterCard ☐ Amer. Exp. ☐ Discover

Acct. No. _____ Exp. Date _____

Signature _____ (required on all credit card orders)

Name _____

Address/Apt.# _____

City _____ State _____

Zip _____ Phone _____

Offer valid for new members only, subject to acceptance by CBC. U.S. orders are shipped 4th Class Book Post. Canada must remit in U.S. funds drawn on U.S. banks. •Canadian orders are shipped International Book Post—add $9.25 shipping/handling. Applicants outside the U.S. and Canada will receive special ordering instructions. A shipping/handling charge & sales tax will be added to all orders. ©1993 CBC

PCC1193

Get 5 Books for only $4.95

plus 1 book FREE upon prepayment

when you join *The Computer Book Club®*

YES! Rush me the following titles, billing me just $4.95 (plus shipping/handling & sales tax). Enroll me as a member of **The Computer Book Club** according to the terms outlined in this ad. If not satisfied, I may return the books within 10 days for a full refund and my membership will be cancelled. I agree to purchase just 3 more selections at regular Club prices during the next 2 years and may resign anytime thereafter.

Code #'s of my books for $4.95

If you select a book that counts as 2 choices, write the book number in one box and XX in the next.

☐ Bill me (FREE book not available with this payment option.)

SPECIAL OFFER: **Prepay your order by check, money order, or credit card and receive a 6th book of your choice FREE.**

☐ YES! I want the FREE BOOK indicated below. My introductory payment of $4.95 plus $4.95 shipping/handling* and applicable sales tax is enclosed. **Code # of my FREE book:** SINGLE SELECTION ONLY

☐ Check or money order enclosed made payable to: McGraw-Hill, Inc.

☐ Charge my: ☐ VISA ☐ MasterCard ☐ Amer. Exp. ☐ Discover

Acct. No. _____ Exp. Date _____

Signature _____ (required on all credit card orders)

Name _____

Address/Apt.# _____

City _____ State _____

Zip _____ Phone _____

Offer valid for new members only, subject to acceptance by CBC. U.S. orders are shipped 4th Class Book Post. Canada must remit in U.S. funds drawn on U.S. banks. •Canadian orders are shipped International Book Post—add $9.25 shipping/handling. Applicants outside the U.S. and Canada will receive special ordering instructions. A shipping/handling charge & sales tax will be added to all orders. ©1993 CBC

PCC1193

MEMORY MEMORY MEMORY

PERSONAL COMPUTER MEMORY

IBM

AMBRA Enterprise 386, Nordic 386, Spectra 386 (all models)
2MB N/A ..... $139 8MB N/A $499

AMBRA Enterprise 486, Nordic 486, Spectra 486 (all models)
4MB N/A ..... $229 16MB N/A $809

PS/1 286, 386SX
2MB 92F0052 ..... $99 4MB 92F0054 ..... $199

PS/1 Consultant, Essential, Expert models x63, x64, PS/Videopoint all models except Cxx series
4MB 96F9292 ..... $299 16MB 96F9291 ..... $879

PS/1 Consultant, Essential, Expert models x7n
16MB KIT 96F9291 ..... $879

PS/2 25/286, 30/286, memory adapter 14F9259
2MB 30F3362 ..... $109

PS/2 55SX; L5, 40SX, 50Z, 55SX; L5, 65SX; L5, 70, 85series
1MB 64F6802 ..... $59 2MB 64F6804 ..... $129

PS/2 70-A21; A61; B21; B61, PS/1 Consultant, Essential, Expert models x11, x13, x14, PS/Videopoint Cxx series
2MB 64F6808 ..... $129

PS/2 55SX; L5, 40SX, 55SX; L5, 65SX; L5, 35Series, PS/Videopoint Cxx series, adapter board 34F3031 or 34F3027
4MB 34F2933 or 87F9977 ..... $229

PS/2 55SX; L5, 40SX, PS/Videopoint Cxx series
8MB 64F6809 ..... $459

PS/2 90 XP, 95 XP, P75 (pairs), 56, 57 (all), PS/1 Pro M2133
2MB 64F6902 ..... $119

PS/2 90 XP, 95 XP, P75 (pairs), 56, 57 (all), PS/1 Consultant, Essential, Expert models x11, x13, x14, PS/1 Pro M2133
4MB 64F6903 ..... $279 8MB 64F6930 ..... $549

Expansion boards for 50, 50Z, 55SX, 60, 65SX
2MB w/2MB 14F7529 ..... $319

Expansion boards for all models 70, 80
4 16MB w/4MB 34F3011 ..... $379

Dell

Power Desktop 325D; P, 333D, 333P, 433P, 486P, 486dd
1MB 310-2505 ..... $59 4MB 310-2507 ..... $229

PowerLine Workstation 420; 425; 433; 450; 450dE/2, 466DE
2MB 310-2466 ..... $119 8MB 310-2468 ..... $459

PowerLine Workstation 420; 425; 433; 450; 450dE/2, 466DE
32MB Kit 310-2630 ..... $1369

Performance T, L & M series
4MB 310-2525 ..... $259 16MB 310-2527 ..... $979

Performance DXE series
4MB 310-3334 ..... $229 8MB 310-3335 ..... $459

Zenith

2-30MB 486 Series 2-4MB OCE, 5-45MB OCE, 7-83MB OCE, 7-125MB OCE $279

AST

Premmia
4MB 501159-001 ..... $229 8MB 501159-002 ..... $459

Manhattan SMP
16MB 501145-001 ..... $899

Bravo 3/25s
2MB 500710-004 ..... $119 8MB 500824-002 ..... $419

Advantage! 386SX/20; 25, Advantage! Pro SX/25, Bravo 3/33s
2MB 502962-001 ..... $149 8MB 502963-002 ..... $439

Advantage! Pro 486DX/33; 50/25, Bravo LC 4/25s; 33s; 33sc 5/66, 4/66s
2MB 500987-001 ..... $109 4MB 500987-002 ..... $229

Premium 386/25; 33; 33T, Premium II 386SX/16; 20; 25
2MB 500783-001, 002 ..... $68

Advantage! 486/25; 33; 33s; 50/20, Bravo 4/33; 486/25; Premium 4/25; 33T1, Server SE 4/33
2MB 500774-004, 700-005 ..... $139

Advantage! 486/25; 33; 33s; 50/20, Power Premium 3/33; 4/33; 33s; 50; 486, Premium 386/33T, 486/25; 6; 55T1; 33; 33s; 33T1, Premium II 386/25; 33; 486/33, 486/50/20 Premium Server SE 4/33
4MB 500780-004 ..... $229 8MB 500780-001 ..... $489

Compaq

ProLinea 3/25s; 3/25ss
2MB 141728-001 ..... $139 8MB 141742-001 ..... $389

ProLinea 4/25s, 4/33, 4/50
1MB 141487-001 ..... $60 2MB 141483-001 ..... $129
4MB 141484-001 ..... $259 8MB 141485-001 ..... $519

DeskPro 386/20, 20e, 25
4MB 131312-001 ..... $119 4MB 113645-001 ..... $269

DeskPro 386s/16
4MB 112504-001 ..... $229 4MB 113604-001 ..... $299

DeskPro 3/25; 33; 4/25/5; 33; 66, 386; 386N; 386N; 386SX/20; 20N, SystemPro/Lite, Portable 486c, 4n Series
1MB 178608-001 ..... $69 2MB 116699-001 ..... $119
4MB 116690-001 ..... $229 8MB 112877-001 ..... $459

ProSignia PC Server 486/33; 0X2/66
16MB 149120-001 ..... $509 32MB 149140-001 ..... $2599

DeskPro 386-33, 486-33; SystemPro
2MB 113504-001 ..... $129 8MB 114561-001 ..... $449

Hewlett-Packard

Vectra 08/16; 20PC, 95/20; 20C; 25; 25C
4MB Kit 01347 or 16436 ..... $279

Vectra 386/16N; 386/20N; 386/25N PC
2MB 32496A ..... $139 8MB 01936A $419

Vectra 486PC; 25S; 33T; 486/20; 4/25; 33S; 50N; 66N
2MB 02281A ..... $119 8MB 02152A $459

Vectra 386/25; 486/25N; 486/33N; 486/50N; 486/66N
2MB 02381A ..... $119 8MB 02152A $549

Vectra 486/25N; 486/33N; 486/50N; 486/66N
16MB 02636A $979

Vectra 386/33N; 33NS
16MB 02214A ..... $139 8MB 02215A $469

FAX MODEMS

For Apple, AST, Compaq, IBM, Sharp, TI, Toshiba, Zenith, and many other Laptop and Notebook Systems.

PCMCIA 2.0 Internal FAX/Modem with XJACK
14,400bps FAX/Modem $429
24/9600bps FAX/Modem $389

Internal FAX/Modems w/MNP-5 & V.42/V.42bis
14,400bps FAX/Modem $419
24/9600bps FAX/Modem $209

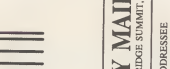
External Pocket Modems for any RS-232 Serial Port
14,400bps FAX/Modem $385
96/9600bps FAX/Modem $319

COMPUTER PERIPHERALS, INC.

VIVa Internal Modems
14,400bps V.32/V.42 modem, and 6 resolve FAX $199
24/9600bps with send/receive FAX $89

VIVa External Modems
14,400bps V.32/V.42 modem, and 6 resolve FAX $219
24/9600bps with send/receive FAX $99

PS/2 DATACARD



Kingston

DeltaCard Micro Channel Storage and Memory Upgrade is available with 85, 127 or 209MB of boardsic 16 enhanced scsi

MONEY BACK 30 DAYS GUARANTEE

WE SET THE STANDARD:

- 100% COMPATIBLE IN FORM, FIT, AND FUNCTION
- ALL PRODUCTS USER INSTALLABLE
- INSTALLATION INSTRUCTIONS INCLUDED
- TOLL-FREE TECHNICAL SUPPORT
- MANUFACTURER'S WARRANTIES
- CORPORATE PO'S, APO/FPO'S WELCOME
- GOVERNMENT AND EDUCATIONAL PRICING
- INTERNATIONAL ORDERS WELCOME
- SPECIAL VOLUME PRICING
- SAME DAY SHIPPING
- OVERNIGHT DELIVERY AVAILABLE
- VISA, MASTERCARD, AMERICAN EXPRESS, AND DISCOVER ACCEPTED
- NO SURCHARGE ON CREDIT CARDS

DON'T SETTLE FOR LESS!

CALL FOR ANY MEMORY

WE STOCK MEMORY UPGRADES FOR ALL SYSTEMS

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 9 BLUE RIDGE SUMMIT, PA

POSTAGE WILL BE PAID BY ADDRESSEE

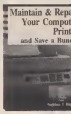
The Computer Book Club®
A Division of McGraw-Hill, Inc.
Blue Ridge Summit, PA 17214-9973

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 9 BLUE RIDGE SUMMIT, PA

POSTAGE WILL BE PAID BY ADDRESSEE

The Computer Book Club®
A Division of McGraw-Hill, Inc.
Blue Ridge Summit, PA 17214-9973



3922P $18.95

3755P $22.95
Softcover

4175P $19.95

3785H $31.95
Hardcover

881744P $19.95

428SH $29.95
Hardcover

881731P $19.95

881670P-XX $29.95
Counts as 2

881854P $29.95

3279P $24.95

4447P $19.95

3759P $19.95

3722P $19.95

881889P-XX $29.95
Counts as 2

3677H-XX $34.95
Counts as 2/Hardcover

4188P $22.95

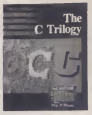
3988P $29.95

881821P-XXX $39.95
Counts as 3

881939P $19.95

881786PXX $27.95
Counts as 2

4089P $18.95



3948P $26.95

4069H-XX $39.95
Counts as 2/Hardcover

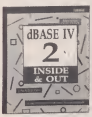
881904P-XX $29.95
Counts as 2

881760P $24.95

881937P $27.95

981958P-XX $24.95
Counts as 2

881910P $29.95



881944P-XX $27.95
Counts as 2

If card is missing, write to:
The Computer Book Club, Blue Ridge Summit, PA 17294-0820

Circle 178 on reader service card.

Select any 5 books for only $4.95 (Values to $179.70)

plus 1 BOOK FREE

when you join **The Computer Book Club®**

881869P-XX $27.95
Counts as 2

8818265P $27.95

As a member of The Computer Book Club . . .

. . .you'll enjoy receiving Club bulletins every 3-4 weeks containing exciting offers on the latest books in the field at savings of up to 50% off of regular publishers' prices. If you want the Main Selection do nothing and it will be shipped automatically. If you want another book, or no book at all, simply return the reply form to us by the date specified. You'll have at least 10 days to decide. If you ever receive a book you don't want, due to late mail delivery of the Bulletin, you can return it at our expense. And you'll be eligible for *FREE* BOOKS through our Bonus Book Program. Your only obligation is to purchase 3 more books during the next 2 years, after which you may cancel your membership at any time.

PCC1193

All books are softcover unless otherwise noted. Publishers' prices shown. If you select a book that counts as 2 choices, write the book number in one box and XX in the next. If you select a Counts as 3 choice, write the book number in one box and XXX in the next 2 boxes. A shipping/handling charge & sales tax will be added to all orders. ©1993 CBC

FREE BOOK available through prepay option only.

For Printers, It's Arlington!

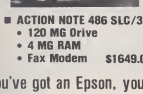
Arlington Computer Products appreciates your interest in our products!

$50.00 Rebate Until 10/31/89

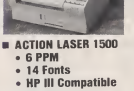
EPSON

FX870	$259	LQ1170	$589
FX1170	$345	LQ2550	$859
LQ570+	$232	DFX5000	$1299
LQ870	$425	DFX8000	$2189
LQ1070	$349	Action 3250	$169
Action Laser 1000			$595
Action Laser 1500			$645
Stylus 300			Call
Stylus 800			$319*

*Call about Mnfg. Rebate†



■ **ACTION NOTE 486 SLC/33**
- 120 MB Drive
- 4 MG RAM
- Fax Modem **$1649.00**



■ **ACTION LASER 1500**
- 6 PPM
- 14 Fonts
- HP III Compatible

■ **STYLUS 800**
- Inkjet at 360 DPI
- 4 Scalable Built-In Fonts

When you've got an Epson, you've got a lot of company.™

CHIPS

256K/1 MG Chips . . each	$3/$5
256K/1MB Simms	$15/$49
4MB Simms	$159
Epson Action 2 MG	$99
HP 2MG Upgrade	$99
OKI Laser 2MB	$125

intel

80387 S/L	$75
80387 SX-16/20/25	$75
80387-16/20/25/33	$85
Overdrive SX20/25	$299/$399
Overdrive DX25/33	$399/$519

TEXAS INST.

486/WINSX 120	$1879
486/WINSX 25 Color	$2149
486/DX2/50	$2975
486/DX2/40 Color	$3579
LASER PS17	$1029
LASER PS23	$869
LASER PS65 Turbo	$1099

SOFTWARE

Aldus Pagemaker 5.0	$519
Corel Draw 4.0	$369
Lotus 123 2.4/3.4	$279/$349
Microsoft Windows 3.1	$69
Microsoft DOS 5.0	$69
Microsoft DOS 6.0 Upg.	$59
Word Perfect 5.2	$279
Word Perfect Windows	$279

DRIVES & TAPES

Connor 120/170	$179/$199
Connor 212/540	$239/$719
Toshiba 3½" 1.44	$69

COLORADO

Colorado Jumbo 120	$145
Colorado Jumbo 250	$169
Colorado Trakker 120	$275
Colorado Trakker 250	$319
Colorado 2GB Ext.	$1069

AMERICAN UPS

250	$99	600	$259
400	$155	900	$369
450	$185	1250	$485

CD ROM OPTICAL DISKS

Fusion CD 16	$485
Pro 16 MultiMedia	$679
Mitsumi Int.	$199
Texel Int. 265 MS Kit	$439

SEAGATE HARD DISKS

40 MB for AT (ST251-1)	$229
80 MB for AT (4096)	$279
120 MG 3144A	$175
245 MG 3283	$279
260 MG 3290A	$525
452 MG 3550A	$449

PLUS HARD CARD

85 MB/127 XL	$229/$249
240 MB	$395

HEWLETT-PACKARD

Laserjet IV w/Toner	$1369
Laserjet IIP+ w/Toner	$799
Laserjet IIIP w/Toner	$879
Laserjet IVL w/Toner	$675
Laserjet IVLM/w/Toner	$1039
Laserjet IVM w/Toner	$1929
Laserjet IV Si w/Toner	$2989
1MG Upgrade	$69
2MG Upgrade	$99
4MG Upgrade	$159
8MG Upgrade	$319
Deskjet 500/500C	$309/409
Deskjet 550C	$575
Deskjet 1200C	$1379
Pacific Page/XL	$259/$699
Pacific Data 25 in 1 Font	$239

NETWORKING

Netware 3.11 5 User	$555
Netware 3.11 10 User	$1269
Netware 3.11 20 User	$1529
Netware 3.11 50 User	$2019
Netware 4.0 10 User	$2019
Lantastic Starter 5.0	$429
E143 Ethernet	$185
NE2000	$119
SMC Hub 8 Port T/P	$325
SMC Hub 8 Port Coax	$325
SMC TP 12 node Conc	$579
SMC-16-6 Pack	$619
SMC Ethercard +/+16	$89/$115
3 Com EtherLink II	$179
3 Com Etherlink III	$119
Etherlink III 5 Pack	$529
Intel Ether 16	$89
Intel Ether 16-5 Pack	$429
Intel Ether 16-20 Pack	$1629
Intel Ether EISA 32	$509
Intel Token Express	$479
Irma Board 3	$399
Xircom Pocket Ethernet	$269

SCAN. & DIGIT.

Epson 600C/800C	$779/$1069
Logitech ScanMan 256	$169
ScanMan w/Omni Page	$209
Mustek Color Artist	$289
Summasketch 12×12	$255
Summasketch 12×18	$499

Panasonic

Office Automation

1124I	$249
2023	$189
2123	$229
2124	$289
2180	$169
1624	$329
1654	$519
2624	$349
4410	$569
4430	$639
4440	$1149
4455	$1699
4410/4450I 2 MG	$129

OKIDATA

ML320	$295
ML321	$415
ML380	$209
ML520	$369
ML521	$489
ML590	$415
ML591	$569
ML395	$859
ML395C	$1029
PM3410	$1199

OL400E	$509
OL810	$699
OL830	$1089
OL850+	$1199
Okidata Laser 2 MG	$125

NEC

P3200	$225
P3300	$325
P6200	$399
P6300	$599
P9300	$925
Model 95 Pscrpt Laser	$969
Model 95FX Pscrpt Laser	$1119
Model 97FX Pscrpt	$1319

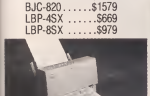
Arlington Computer Products, inc.

FOR ORDERS & QUOTES:

800-548-5105

Canon

BJ-10EX $239
BJ-200 .....$285
BJ-230 .....$389
BJ-300 .....$325
BJ-330 .....$489
BJC-800.....$1449
BJC-820.....$1579
LBP-4SX $669
LBP-8SX $979



■ BJ-200 - 360 DPI
- 4 PPM

NEW TECHNOLOGY!

■ NOTEJET 486 - SLC/25
- 486 SLC/25 Mhz
- Built-In "Bubble-Jet" printer
- 85 MG, 135 MG, or 180 MG
- 4 MG Ram .....CALL

(Very Competitive Pricing!)

■ NOTEBOOK 486 - SLC/25
- 120 MB • Fax Modem
- 4 MG..... $1595.00

Canon has "Bubble-Jet" Technology!

CANON INNOVA COMPUTERS

One Year On-Site Warranty!

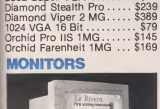
■ 486-DX 33, 4 MB, 240 MG, .28 SVGA Monitor, 3.5 and 5.25 Drives, Fax Modem, Dos, Windows 3.1, MS Works $1649.00

■ 486-DX 66, 4 MB, 245 MG, .28 SVGA Monitor, 3.5 and 5.25 Drives, Fax Modem, Dos, Windows 3.1, MS Works $1949.00

VIDEO BOARDS

ATI VGA Wonder 1MG ... $139
ATI VGA Stereo $199
ATI Graph Ultra+ 1MG ... $199
ATI Graph Ultra + 2MG .. $209
ATI Graph Prof 1 MG $319
ATI Graph Prof 2 MG $329
Sound Blaster Pro $129
Boca Super VGA $99
Diamond Stealth Pro $239
Diamond Viper 2 MG..... $389
1024 VGA 16 Bit $79
Orchid Pro IIS 1MG..... $145
Orchid Farenheit 1MG ... $169

MONITORS



NEC

3 FGE $579
4 FGE $679
5 FG $1245
5 FGE $1049
6 FG $2249

MITSUBISHI

EGA $239
Diamond Scan 4533C $519
Diamond Pro 17 ..... $1019
6605 16" $939
HL6955 20"..... $1759

NANAO

F340I..... $699
F550I..... $1059
T560I $1759
T760IW..... $2149

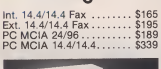
PANASONIC

1381 VGA 1024×768..... $319
1395 VGA 1024×768..... $429
1991 VGA 1280×1024.... $1539

MODEMS

intel.

Int. 14.4/14.4 Fax $165
Ext. 14.4/14.4 Fax $195
PC MCIA 24/96 ..... $189
PC MCIA 14.4/14.4..... $339



SatisFAXtion MODEMS

200 2400 V.42/9600 Fax ... $269
300 14.4/9600 Fax..... $219
350 14.4 ..... $299
400 14.4/14.4 Fax $365
400 Ext 14.4/9600 Fax $365

Hayes

Hayes Accura 96/Fax $219
Hayes Accura 14.4/Fax... $245
Hayes Optima 96 ..... $309
Hayes Optima 14.4/Fax ... $369
Hayes Ultra 96..... $539
Hayes Ultra 96 14.4 ..... $589

PRACTICAL PERIPHERALS

Practical Per. 9600 Int. ... $169
Practical Per. 9600 Ext.... $179
Practical Per. 14.4 Int.... $185
Practical Per. 14.4 Ext. ... $195
Practical Per. 14.4 Pocket $325
Practical Per. FaxMe $119

U.S.Robotics

16.8 HST Ext..... $459
14.4 Dual Std. 16.8..... $659
Sportster 14.4 Int..... $155
Sportster 14.4 Ext. $169
Sportster 14.4 Int. Fax.... $169
Sportster 14.4 Ext. Fax ... $195
Worldport 14.4..... $325

Circle 161 on reader service card.

ARLINGTON COMPUTER PRODUCTS... GREAT SERVICE SINCE 1984!

■ PC Magazine "...Arlington offers worry-free mail order purchasing!"

■ PC Sources Review "...You can be confident that what you order will work!"

■ PC Computing "...Courteous service and terrific technical support!"

■ PC Computing Mail Order Review of Peripheral Specialists 8/93. We received the only 5 Star Rating for Price!

Prices and availability subject to change without notice. Qualified purchase orders accepted.

CIRCLE 336 ON READER SERVICE CARD

Hours C.S.T.
7:30-7:30 pm Mon-Fri
9:00-5:00 pm Saturday

1970 Carboy,
Mt. Prospect, IL 60056

NO SURCHARGE FOR CHARGE CARDS!

CUSTOMER SERVICE AND IN ILLINOIS
708-228-6333
SHIPPING
708-228-9748
TECHNICAL ASSISTANCE
708-228-1470
FAX
708-228-0516

Arlington Computer Products, inc.

FOR ORDERS & QUOTES:

800-548-5105

Mail Order Made Easy!

By...USA FLEX...THE BEST NAMES

PRINTERS

IBM[1] PRINTERS BY LEXMARK™

LEXMARK

LASER PRINTERS

LaserPrinter 4019 E	$749
LaserPrinter 6	$969
LaserPrinter 10	$1129
LaserPrinter 4039 10R	$1349
LaserPrinter 4039 12R	$1690
LaserPrinter 4039 10N	$1849
LaserPrinter 4039 12L	$2449
LaserPrinter 4039 16L	$2749

COLOR PRINTERS

PS4079 Color	$2499

EPSON LASER PRINTERS — EPSON

ACTION LASER 1000	$589
ACTION LASER 1500	$649
ACTION LASER 1500-II	$699

EPSON DOT MATRIX PRINTERS

LX-810	$169	LQ-870	$439
AP 3250	$174	LQ-1170	$598
LQ-570+	$239	LQ-2550 Clr.	$899
FX-870	$268	DFX-5000	$1299
FX-1170	$349	DFX-8000	$2199
LQ-1070+	$359	Stylus 300	$234

Stylus 800 Ink Jet Printer ... $269+*
*Includes $50 Rebate from Epson

Panasonic Quality Authorized

LASER PRINTERS

KX-P4410	$549	KX-P5410	$1029
KX-P4430	$639	KX-P4450i	$839
KX-P4440	$1144		

DOT MATRIX PRINTERS

KX-P1150	$129	KX-P1624	$324
KX-P2180	$154	KX-P1695	$344
KX-P2023	$189	KX-P2624	$349
KX-P2023	$224	KX-P1654	$519
KX-P2124	$294	KX-P1124i	$209

NEC

LASER PRINTERS

SILENTWRITER 95f	$869
SILENTWRITER Model 610	$629
SILENTWRITER 95fx	$1099
SILENTWRITER 97	$1349
SILENTWRITER 97fx	$1269
SILENTWRITER Model 1097	$1379
NEC Jetmate 1000	$269

TEXAS INSTRUMENTS — NEW AT USA FLEX!

microWriter Basic	$519
microWriter PS23	$670
microWriter PS65	$935
microMarc™	$279

Canon

BUBBLE JET PRINTERS

BJ-10ex	$239	BJ-800C	$1499
BJ-200*	$259	BJ-820C	$1629
BJ-230	$399	BJC-600	$589

LASER BEAM PRINTERS

LBP-4SX	$669	LBP-8SX	$1299
LBP-430	$589		

*after $30 rebate.

CD/ROM Drives and Bundles

***The Desktop Library™ from* SONY**

Complete CD-ROM Kits
Include everything from the Drive to the CD Titles
550ms average access time, Interface card, all cables, 16-bit Pro Audio Spectrum 16 sound board, Sony SRS-58PC speakers w/ batteries, 6 CD titles.
Internal Half-height CD-ROM *CDU-31A-LI/L* $459
External Slim-line CD-ROM & Interface adapter *CDU-7305* $559

Multimedia CD-ROM Starter Kit
550ms average access time
Interface card & cables, 6 CD titles.
Internal Half-height CD-ROM *CDU-31A-LI/N* $279

Special on Factory Serviced Sony External CD-ROM Drive
•340 ms access time, 150KB/sec. transfer rate, 8K buffer • Built-in audio, Sony Interface card, 7 CD titles.
$349 *D1-CD7205-R*

SONY LASER LIBRARY

TEXEL

DOUBLE THROUGHPUT CD/ROM KITS
265ms average access time!, SCSI II compliant SCSI interface adapter
Internal Drive *D1-DM3024T130* $449
External Drive *D1-DM5024T130* $529

MITSUMI

CD-ROM Drives
350ms average access time
Includes 16-bit interface, cable & device driver.
Internal Half-Height form factor
Internal Drive *D1-LU005* $179

PHILIPS

<500ms average access time
Complete installation package
Internal Drive *D1-CDD462RS* $439

NEC

MultiSpin 3Xe Ext. CD/ROM *D1-CDR-3XE* ... $559
MultiSpin 3XI Int. CD/ROM *D1-CDR-3XI* $469
MultiSpin 3Xp Personal CD/ROM
D1-CDR-3XPW (White) D1-CDR-3XPG (Gray) $429
MultiSpin 74 (Ext.) *D1-CDR-74-1* $389
MultiSpin 38 (Port.) *D1-CDR-38* $259

SONY

340ms average access time
Includes genuine Sony interface card
Internal Drive *D1-CD535 & D1-OPA461* $338
External Drive *D1-CD7201 & D1-OPA462* $528

CD-ROM BUNDLES
HOME CD-ROM drive on left, Stereo Headphones, Amplified audio speakers, 10 CD/software titles
Int. CD-ROM Bundle *D1-DM3024CB2* $499
Ext. CD-ROM Bundle *D1-DM5024CB2* $599
MULTIMEDIA CD-ROM drive on left, Stereo Headphones, Deluxe microphone, Media Vision 16-bit soundboard, speakers, 13 CD/software titles
Int. CD-ROM Bundle *D1-DM3024MB2* $829
Ext. CD-ROM Bundle *D1-DM5024MB2* $929

MONITORS

NEC

Factory Serviced

3FGx	$349	14" SVGA	$309
4FG	$429	15" 3V	$509
5FG	$1079	15" 3FGe	$579
Special Purchase		15" 4FGe	$689
3D	$359	17" 5FGe	$1049
5D	$1099	17" 6FG	$1249
		21" 6FG	$2279
		17" 6FGp	$1359
		21" 6FGp	$2369

SAMSUNG ELECTRONICS

14" CVL4955	$229
14" SyncMaster 2	$239
14" SyncMaster 3	$279
14" SyncMaster 3n	$299
15" SyncMaster 15C	$449
17" SyncMaster 4 Plus	$649
17" SyncMaster 5C	$699

FLEXVISION

14" 1024X768	$289
15" 1280X1024	$429

CTX

14" S439-A	$219
14" S468/NI	$249/269
14" CP5 1461LR	$299
15" CP5 1561	$369
15" CP5 1560IR	$379
17" CPS 1760 Proscan	$719

MAG

14" LX1450	$319
15" MX15F	$529
17" MX17F	$949

HITACHI SuperScan™

15"	$479
17"	$939
20"	$1389
Pro20"	$1689
Pro21"	$2199

SONY

14" CPD-1320	$339
14" CPD-1304S	$499
17" CPD-1604S	$949
20" GDM-2036S	$2099

DATA CARTRIDGES

Buy Five get the sixth one FREE!*

3M DATA CARTRIDGES

DC2000	40/80MB	$12.95 ea.
DC2120	120/250MB	$18.95 ea.
DC2120 Ximat (QIC-80)		$21.95 ea.
DC2120 Rhomat		$24.95 ea.
DC600A		$20.95 ea.
DC6150	250/500MB	$19.95 ea.
DC6250	250/500MB	$24.95 ea.
DC6525	350/700MB	$32.95 ea.

* One free cartridge per customer. Offer good thru January.

TAPE BACK-UP

COLORADO MEMORY SYSTEMS INC.

Ask about special on tape caddy.

JUMBO 250	250MB storage capacity
INT. SYSTEM	$179 . EXT. SYSTEM $269
JUMBO TRAKKER 120MB	$289
JUMBO TRAKKER 250MB	$349
POWERTAPE™	
2GB INT./EXT.	$949/1089
4GB INT./EXT.	$1489/1589

VIDEO CARDS

DIAMOND

SPEEDSTAR PRO 1MB ISA/VLB	$109/$119
STEALTH PRO VLB 2MB	$339
VIPER VLB 2MB	$399

ATI Technologies Inc.

GRAPHICS ULTRA+ 1MB/2MB	$219/$249
GRAPHICS ULTRA™ PRO 2MB ISA/VLB/EISA	$359/$359/$399

ORCHID Perfecting The PC

ProDesigner II/s 1MB	$149
Fahrenheit 1280+ 1MB ISA/VLB	$159/$179
Fahrenheit VA 1MB ISA/VLB	$169/$179
Celsius VLB 1MB	$249

H-P FAX MACHINES

HEWLETT PACKARD

HP FAX-200 Plain paper fax	$899
HP FAX-310 Plain paper fax	$1179

MODEMS

Hayes

	Int./Ext.
ACCURA 2400	$65/75
ACCURA 96+FAX96	$189/209
ACCURA 144+FAX144	$199/229
POCKET EDITION™ 2400	$119

U.S. Robotics

	Int./Ext.
Sportster 9600 FAX	$159/$169
Sportster 14.4 FAX	$179/$199

FLEX *ultimate*
14,400/14,400 V.32 MODEM
Communication S/W and FaxWorks
Fax S/W both for DOS and Windows.
Int. $149 Ext. $169

TO ORDER, CALL...

USA FLEX

1-800-723-0334

OPEN 24 HOURS MONDAY THRU FRIDAY EASTERN TIME 9AM - 9PM SAT. 9AM - 4PM

CODE # PC1103 471 Brighton Drive, Bloomingdale, IL 60103

Circle 239 on reader service card.

IN THE BUSINESS FOR LESS!

COMPUTER SYSTEMS, MONITORS AND PRINTERS

AST COMPUTER
Not Just Fast, But Right The First Time!

NEW AST BRAVO DESKTOP SERIES

Models 123W:
120MB HD, 4MB RAM, 1MB video graphics RAM

Models 213W:
210MB HD, 8MB RAM, 1MB video graphics RAM

Bravo LC (5 bay desktop case)

4/25s	123W	$999
4/33s	123W	$1,169
4/33	213W	$1,269
4/33	213W	$1,499
4/50d	123W	$1,529
4/50d	213W	$1,769
4/66d	123W	$1,789

Bravo MT (6 bay mini-tower case)

Models 173W:
170MB HD, 4MB RAM

Models 343W:
340MB HD, 8MB RAM

4/33	173W	$1,499
4/33	343W	$1,929
4/66d	173W	$1,999
4/66d	343W	$2,469

AST BRAVO Notebooks (486SX- 25)

Mono.	80MB HD	$1,659
Mono.	120MB HD	$1,769
Mono.	170MB HD	$1,869
Color	120MB HD	$2,449
Color	170MB HD	$2,529
Color Plus	170MB HD	$3,649

COMPAQ

DESKTOPS SYSTEMS

COMPAQ PROLINEA CDS 486SX-25 with 8K 4-way internal cache, 120/240*MB HD, 3.5" FD, 4MB RAM, Built-In CD/ROM Player&Sticks, Sound board, modem, Prodigy, DOS Win. 3.1 ..... *$1399

COMPAQ PROLINEA 4/25s 486SX-25MHz, 120/240*MB HD, 4MB RAM, 5.25" Floppy, PFS, DOS, Win 3.1, Prodigy, Modem, Mouse *$999

486SX-25MHz, 240/480*MB HD, 4MB RAM, 5.25" Floppy, PFS, DOS, Win 3.1, Prodigy, Modem, Mouse *$1099

COMPAQ PROLINEA 4/66 486DX-66MHz, 360/680MB HD, 4MB RAM, 5.25" Floppy, PFS, DOS, Win 3.1, Prodigy, Modem, Mouse *$1999

NOTEBOOK PORTABLES

COMPAQ LTE Lite 486SL-25MHz Mono-Ultra/Pwr Active Matrix Screen, 120/240MB HD, 4MB RAM, DOS, Win. 3.1, Trackball, 6.4lbs *$2999

PRINTERS

COMPAQ PAGEMARQ 15 15 ppm, 16MHz and 29000 RISC, 800 x 400 Max. Res., PS Level 2 ..... *$1599

COMPAQ PAGEMARQ 20 20 ppm, 16MHz and 29000 RISC, 800 x 400 Max. Res., PS Level 2 ..... *$3749

MONITOR

COMPAQ VIDEO GRAPHICS COLOR 14" Flat picture tube, 640 x 480 @ 60Hz max. graphics res. .31mm dp $199

* The two numbers refers to the HD with/without DOS Data Compression.

NOTEBOOK and LAPTOP COMPUTER SYSTEMS

TOSHIBA

T1900 - i486SXA-20, 4MB RAM
120/200MB HD ..... $1699/$1949

T1900C Color (P) - i486SXA-20, 4MB RAM
120/200MB HD ..... $2329/$2569

T1950 - i486DX2-40, 4MB RAM
120/200MB HD ..... $2059/$2299

T1950C Color (A) - i486DX2-40, 4MB RAM
120/200MB HD ..... $2649/$2899

T4600 - i486SL-33
120/200MB HD ..... $2529/$2659

T4600C Color (A) - i486SL-33
120/200/340MB HD ..... $3899/$4159/$4579

T6600C Color (A) - i486DX2-66, 510MB *$6399

T6600C/CD Color (A) - i486DX2-66, 510MB, CD-ROM *$6899

T6600C/CDV Color (A) - i486DX2-66, 510MB, CD-ROM, Sound, DVI .. *$7999

TEXAS INSTRUMENTS

TravelMate WinSLC™ 25MHz 80MB HD, 4MB RAM *$1489
TravelMate 4000 WinSX/25 120MB HD, 4MB RAM *$1879
TravelMate 4000 WinDX/25 - 120MB HD, 4MB RAM *$2049
200MB HD, 4MB RAM *$2219
TravelMate 4000 WinDX2/50 - 120MB HD, 4MB RAM *$2639
200MB HD, 8MB RAM *$2979
TravelMate 4000E WinSX/25 Advanced Passive Color - 120MB HD, 4MB RAM *$2129
TravelMate 4000 WinDX2/40 Color (P) - 200MB HD, 8MB RAM *$3229
TravelMate 4000E WinDX2/50 Active Color - 200MB HD, 4MB RAM *$3629

PORTABLE POWER!
From IBM, HP, & USA FLEX!

HEWLETT PACKARD
Authorized Dealer

Authorized Advanced Products Dealer

Business Partner

FREE FEDERAL EXPRESS SHIPPING!
Orders by 3 p.m. (CT) Ship the Same Day!
(Subject to credit approval.)

IBM PS/note™ i386SL-25MHz, 8SMB HD, Modem, Prodigy, Winfax LITE & Promenade.

LIMITED QUANTITY

Everything You See Here Only...

$1698

Here's What You Get...

IBM PS/note Computer
$1499 - $50* = $1449

HP DeskJet Printer
$324 - $75** = $249

You Save...$125

*Save $50 on IBM PS/note when purchased with HP DeskJet Printer.
**Get $75 Mail-in Rebate on HP Portable DeskJet. (See Below.)

Printer shown w/ opt. cut sheet feeder.

IBM PS/note—IBM Quality and Reliability

- Lightweight size 8.3" D x 11.7" W x 1.9" H — only 5.2 lbs. with battery
- Powerful, energy-saving i386SL-25MHz with 2MB memory, exp. to 10MB
- 85MB hard drive and 3.5" 1.44MB floppy drive
- 10" VGA display—with 64 shades of gray
- 85 Key keyboard and LogTech Trackman portable mouse
- NiCad 4- hour battery—1 hour quick recharge
- 2400/9600 internal data/fax modem w/software
- 1 year IBM limited warranty w/48 hour Express Maintenance
- **Preloaded Software:** IBM PC-DOS 5.0, Windows 3.1, WinFax LITE, PRODIGY, Promenade, Address Book Plus, PS/note Tutorial, PS/note Index, and PS/note Fitness. (Software is pre-installed. There are no diskettes.)

HP DeskJet Portable Printer

- Plain paper drop-on demand thermal inkjet printing
- HP PCL 3 (with extensions) printer language
- 300 dpi, laser-quality printing in both DOS and MS-Windows™
- Water resistant ink — No smearing!
- Lightweight size (12"x5 3/4"x2 1/2")—just 4.4 lbs.
- Up to 240 cps (10 cpi) & prints up to 3 ppm (draft)
- 48 Kb buffer • 84 typeface, size, & style combos
- Custom carrying case and I/O cable included
- One year limited warranty (worldwide)

Save $75 on the HP DeskJet Portable Printer

Genuine Hewlett-Packard Accessories

• Hewlett Packard will send you a **75 REBATE** on the DeskJet Portable Printer when purchased with one of the following accessories. The printer and accessories must be purchased at the same time. Offer expires October 31, 1993.

- Rechargeable Battery *C3003A* $34.95
- Worldwide Battery Recharger *C3004A* $69.95
- 50 Page Cut Sheet Feeder *C3005A* $69.95
- Carrying Case *C3030A* $69.95

HP Support Pack
- 3 Year Express Exchange
- HP's overnight replacement plan
U5461A **$55**

(708) 582-6206 • FAX (708) 351-7204
Government 1-800-723-2260/Education 1-800-944-5588
Government/Education FAX (708) 351-9671
Habla Espanol 1-800-723-5500 • (708) 924-6780
Pour les Francophones 1-800-723-2256 • (708) 582-6179
Verhandlungen in deutsch (708) 924-6680
(7:00 Uhr bis 15:00 Uhr)(Mindnight to 9:00 a.m. cst)
Customer Service 1-800-955-1488
(7:30 a.m. - 6:00 p.m. Mon.-Fri. & Sat. 9 a.m. - 2 p.m. CST)

ORDER INFORMATION: Minimum order $60. Minimum shipping and handling per order $11.95. MasterCard, Visa and Discover accepted for USA, Canada, APO, FPO and Puerto Rico. PLEASE!! accepted for continental USA only. A $10 surcharge on credit card orders for APO, FPO and Puerto Rico. C.O.D. order under $500.00, add $5.00; over $500.00, add $10.00 check warranty charge. Call for special UPS Red/Blue C.O.D. rates. APO/FPO, add 8% to cover additional shipping and handling. Call for P.N. rates. COMPUBATE/SOFTBENDER/USR Corporation rate of 1.41 is better than USR Corporation rate of 1.41. Call for P.N. rates. Leasing Plans available for qualified businesses only. RETURN PRODUCT REQUIRED. All returns must have prior authorization by our Customer Service Department. Call (708) 582-6206 for RMA. Defective items must be returned in original packaging. Shipping charges are not refunded. Restocking charge of 15% (min. $25.00 max. $50.00 cst. 5 wks. for 2 p.m. cst). All returns must be in as-shipped condition, with original packaging, including all accessories, manuals, and warranties and refund shipments are subject to a minimum 20% restocking charge. We will only accept returns on unopened and non-downloaded software. Software compatibility guaranteed only if we have downloaded it on your machine. Prices, specifications, and availability are subject to change without notice. Rebates applies to FLEX system only. Rebates, premiums or other non-related gifts or promotions are not to be used in conjunction with any other rebates, premiums or other non-related gifts or promotions. Rebates are not applicable for typographical or pricing errors. All trademarks and registered trademarks are the property of their respective holders. © 1993 USA FLEX.

CODE # PC1103

Circle 240 on reader service card.

PRINTER SHARING & MEMORY

800-238-9415

LCX-1000 (1Mb) **$495**
8 ports; 4 serial I/O; 57,600 bps
2 parallel in, 2 parallel out

LC-256 (256Kb) **$375**
LC-512 (512Kb) **$425**
8 ports; 4 serial I/O; 19,200 bps
2 parallel in, 2 parallel out

LXFR-ETC **$49**
DOS, Windows & OS/2 File Transfer
4 user license, for LC or LCX

PB-42PP-256Kb **$199**
PB-42PP-1Mb **$279**
PB-42PP-4Mb **$429**
6 parallel ports; 4 in / 2 out
Upgradable to 4Mb; 25,000 cps

LC Jr.-256 (256Kb) **$199**
LC Jr.-512 (512Kb) **$249**
5 ports; 4 serial in, 1 parallel out
Up to 115,200 bps

LC-41PAS **$69**
5 parallel ports; 4 in / 1 out
Smart-switch; 25,000 cps

SPPS **$49**
9600 bps to 115,200 bps
Serial / Parallel Converter

PB-11PP-1Mb **$199**
2 parallel ports; 1 in / 1 out
Upgradable to 16Mb; 25,000 cps

PC SIMMs
MAC SIMMs
POWERBOOK
PCMCIA
TOSHIBA

NEW SOFTWARE

TicklerFile™ for Windows
Planner that posts notes

MicroPaint™ for DOS
256 color image processing

AmazinGames™ DOS & Windows
Block dropping and mazes

LOGICAL CONNECTION® 4660 Portland Road NE #108 Salem, OR 97305-1658 Tech.: (503) 390-9375 **FAX: (503) 390-9372**

Circle 125 on reader service card.

STOP! DON'T TRASH YOUR OLD PC

...Give it 486 power for $199

Get a 486 Power Kit™ and get faster Windows and instant overall performance. And get it now.

SPEED UP YOUR 25MHZ 386 BY 75% FOR ONLY $199; YOUR 286 BY UP TO 500% FOR ONLY $329.

- Works with IBM, Compaq, Dell or any IBM compatibles
- 33 and 40 MHz versions available
- Clock doubling and motherboards also available

EASY TO INSTALL.
"It took longer to take the cover off the machine than to upgrade," says Jim Nardone. All software applications and peripherals are fully compatible.

YOUR 486 POWER KIT™ INCLUDES:

- Texas Instruments™ 486DLC CPU
- Special cache-activating software
- Easy installation guide
- Chip removal tool

BUFFALO
1-800-345-2356

ORDER NOW AND GET SPEEDKIT™ BY HYPERWARE™ FREE!

Get even more speed with the disk-cache software PC WORLD says, "dramatically improves disk-access operations for both Windows and DOS programs."
It's a $49.95 value, FREE.

45-DAY MONEY-BACK GUARANTEE.
So don't trash your PC. Get a 486 Power Kit™. Satisfaction guaranteed or you get a full refund. We pay for return shipping. Toll-free technical support — real people; not voice mail. 5-year full replacement warranty. **Call today at 1-800-345-2356 or fax: (503) 585-4505**
Response Code: B3PKC

VISA MasterCard

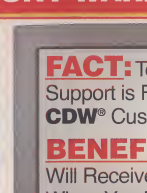
BUFFALO is a registered trademark of Melco, Inc. 486 Power Kit is a trademark of Buffalo Products, Inc. All other brands and product names are trademarks or registered trademarks of their respective owners.

Circle 258 on reader service card.

COMPUTER DISCOUNT WAREHOUSE™

CDW

ANOTHER FACT ABOUT COMPUTER DISCOUNT WAREHOUSE™



FACT: Technical Support is Free For **CDW®** Customers

BENEFIT: You Will Receive Help When You Need It.

WHY PAY RETAIL? CDW® SELLS SOFTWARE FOR LESS!

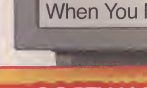
NEW

WordPerfect 6.0 For WINDOWS

ONLY $279.92

31971

5TH GEN FASTBACK PLUS/WIN	96.49
5TH GEN DIRECT ACCESS	53.15
5TH GEN FASTBACK PLUS V6.0	38.44
ADOBE PHOTOSHOP V3.0	441.26
ALDUS PAGEMAKER V5	502.17
ANTIVIRUS DIAGNOSTIC SOFTWARE	29.17
ARTISOFT LANTASTIC AI V5.0	79.17
ARTISOFT LANTASTIC AWIN V5.0	69.91
ATI MEGA WINDER	209.49
AUTODESK AUTOSKETCH/WIN	167.66
BERKELEY AFTER DARK	33.07
BITSTREAM FACELIFT FOR WP V3.0	59.73
BORLAND TURBO PASCAL V7.0	59.41
BORLAND TURBO C++ FOR FRAMEWORK	59.41
BORLAND C++ V3.1 W/NICE	322.88
BORLAND TURBO C++ V3.0	67.73
BORLAND BRIEF V3.1	59.88
BORLAND PARADOX V4.0 UPG	174.88
BORLAND PARADOX V4.0 LAN PACK	1,174.88
BORLAND PARADOX SPECIAL EDITION	81.34
BORLAND PARADOX V4.0 W/ SQL LINK	1,174.88
BORLAND TURBO C++ WIN VISUAL EL	78.15
BORLAND DBASE IV V2.0 LICENSE/NODE	275.84
BORLAND DBASE IV V5.0	524.39
BORLAND DBASE IV V2.0 UPG	95.89
BORLAND PARADOX/WIN	59.88
QUATTRO PRO/DOS V5.0	39.95
QUATTRO PRO/WIN V5.0	39.95
BRODERBUND AUTOMAP FOR WINDOWS	124.39
BRODERBUND PRINTSHOP DELUXE/WIN	48.46
CACHE OMNIPAGE PRO V3	886.12
CENTRAL POINT PC TOOLS V8.0A	114.95
CENTRAL POINT PC DOS/WIN	114.95
CALIXA WORDSCAN PLUS/WIN	369.48
CALIXA OCR V3.0	224.75
CA-OLIPFER V3.0 COMPUTER LPG	139.73
CONNECT EMAIL CONNECTION	81.87
COREL DRAW V3.0 WITH CD	127.21
COREL DRAW V4.0 WITH CD	384.40
COREL DRAW 3 & TO 4.0 UPG	154.40
COREL SCSI	69.79
CLARIS FILEMAKER PRO WIN V2.1	117.73
DASSOFT OA CLIENT/WIN	87.06
DCA CROSSTALK/WIN V2.5	112.21
DELUNA PSYCHE PRO PLUS V1.0	233.44
DELUNA WIN-FAX PRO V3.0	75.63
DELUNA WIN-FAX PRO V3.0	75.63
XTREE GOLD V3.0	87.46
FUTURUS DOS/WIN COMBO V2.1 25 USER	1570.77
GENETIC CADD V6.1	258.12
HAYES SMARTCOM/WIN	41.78
HELIX NETROOM 1 USER	39.14
IBM OS/2 V2.1	142.35
IBM OS/2 V2.1 UPG	91.49
IBM DOS V6.1 UPG	52.67
INSET SYSTEMS HULKAK PRO V2.0	83.36
INTEL PAXAR LIT PLUS OCR V2.0	75.91
INTUIT QUICKCHASE/WIN V2.0	96.01
INTUIT QUICKPAY DOS/WIN V2.8	39.48
INTUIT QUICKTAX/WIN V2.0	42.92
INTUIT QUICKBOOKS	103.87
INTUIT QUICKBOOK QUICKBOOK & QUICKPAY	103.87
INTUIT QUICKENDOS V6.0	43.89
INSIGNIA ACCESS PC V3.0	78.10
KODAK PHOTO CD ACCESS/WIN	32.93
LASERTOOLS PRINT CACHE	48.10
LOTUS 123 V5 4K DEFMER	269.98
LOTUS 123 V4.4 MODE	303.58
LOTUS 123 V4.4 UPG	284.95
LOTUS 123/WIN V4.0 LICENSE	228.21
CC MAIL 10 USER PACK	222.02
PRO AMPRO/WIN V3.01	228.97
LOTUS SMARTSUITE V2.0	445.28
LOTUS SMARTSUITE	445.28
LOTUS AMPRO V5.01 COMP UPGRADE	95.17
LOTUS SMARTSUITE V2.0 UPG	333.21
LOTUS AMPRO/WIN V3.01 VERS UPG	81.25
LOTUS 123/WIN V4.0 UPG	99.42
LOTUS FREELANCE GRAPHICS V2.01 UPG	121.89
LOTUS FREELANCE GRAPHICS V2.01	99.94
LOTUS 123 R3.4 UPG	95.89
LOTUS 123 R.4 UPG KIT	76.26
LOTUS 123 V2.4 NODE UPG	87.95
LOTUS AMPRO/WIN V2.0	99.42
LOTUS ORGANIZER V1.0	97.39
PRO AMPRO PLUS/WIN	51.75
MICROCOM CARBON COPY PLUS V6.1	135.02
MICROCOM CARBON COPY PC/WIN	71.28
MICROLIMIT V2.0	71.28
MICROGRAFX ABC FLOWCHARTER/WIN	318.62
MICROGRAFX PHOTO PALLET	57.87
MICROSOFT FORTRAN V5.1	99.22



Lotus 1-2-3 V4.0 FOR WINDOWS

ONLY $294.85

29306

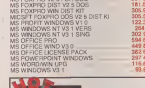
MS ACCESS DIST KIT	303.35
MS ACCESS V1.1 LICENSE	208.46
MS POWERPOINT/WIN V3.0	118.28
MS OFFICE V3.0	118.28
MS PUBLISHER/WIN V2.0	118.28
MS PUBLISHER/WIN V2.0	85.47
MS MULTIMEDIA SOUTWAN	44.5
MS VISUAL BASIC COMP UPG	153.10
MS VISUAL BASIC PROWIN V3.0	68.88
MS VISUAL BASIC V3.0	299.17
MS WORKGROUP ADD-ON USER	123.47
MS WORKGROUP ADD-ON	83.91
MS WORKGROUP ADD-ON 5 PACK	351.76
MS WORKGROUP ADD-ON UG	54.29
MS WINDOWS PRINTING SYS	127.98
MS VERS UPG PROWIN	129.93
MS FOXPRO 2.6 DIST KIT UPG WIN	183.1
MS FOXPRO WINDOWS V2.5	95.91
MS FOXPRO V2.5 COMP WIN	179.84
MS FOXPRO V2.5 DIST WIN	179.84
MS FOXPRO DOS V3 W/DEC	98.66
MS FOXPRO COMP V2.5 DOS	140.15
MS FOXPRO V2.5 FOR DOS	98.66
MS FOXPRO DIST V2.5 DOS	181.53
MS FOXPRO WIN DIST KIT	305.07
MSFT FOXPRO DOS V2.6 DIST KI	305.07
MS FOXPRO DOS V2.6 UPG	183.1
MS WORKGROUP NT V3.1 VERS	234.8
MS WINDOWS NT V3.1 SING	302.99
MS OFFICE PRO	594.62
MS OFFICE WIN V3.0	449.83
MS OFFICE LICENSE PACK	383.42
MS POWERPOINT WINDOWS	118.28
MS OFFICE WIN V3.0	118.61
MS WINDOWS	95.89

Borland QUATTRO PRO V5.0

ONLY $39.95

29106

MS MACRO ASSEMBLER V6.1	129.82
MS OFFICE COMP UPG	347.28
MS OFFICE PRO V6.0 VERS UPG	87.88
MS WORKDOCS V6.0	319.91
MS WORKDOCS WIN V3.0	319.91
MS C COMPILER V7.0	302.93
MS VISUAL C++ COMP UPG	183.1
MS VISUAL C++ PRO UPG	132.97
MS VISUAL C++ PRO	335.79
MS VISUAL C++ WINDOWS NT	87.88
MS WINDOWS V3.1 UPG	95.89
MS WINDOWS LICENSE	79.38
MS WORD V6.0	297.47
MS WORDWIN V2.0 LICENSE UPG	99.35
MS EXCEL V4.0	297.47
MS WORD V6.0 COMP UPG	99.31
MS WORD V6.0 VERS UPG	87.88
MS WORD DOS V5.0	53.98
MS ACCESS/WIN	417.15
MS ACCESS V1.1	19.11
MS ACCESS V1.1	303.36
ONLINE OPTINET 1-8 USERS	617.90
PACIFIC MICRO MAC-INSIGHT	58.53
PEACHTREE ACCOUNTING/WIN V2.0	107.84
PEACHTREE ACCOUNTING/WIN V3.0	107.84
POWERUP CALENDAR CREATOR + WIN	42.63
QUALITAS 386 MAX V7.0	69.87
QUARTERDECK DESKVIEW 386 V2.6	36.53
QUARTERDECK DEMM V7.0 B	81.85
QUARTERDECK DEMM V7.0 UPG	42.12
QUARK EXPRESS	231.93
QUARTERDECK OFFICEWINTER V6.2	231.93
HARVARD GRAPHICS V3.06	358.79
SPC HARVARD GRAPHICS V3.0 DOS	358.76
HARVARD GRAPHICS WINDOWS V1.03	347.34
HARVARD GRAPHICS WIN V1.03 UPG	129.99
PRO WRITE	129.99
SAMPER LAN WORKSTATION V1.0	59.66
SAMPER LAN WORKSTATION NODE LIC	29.91
CDW CD BUSINESS BUNDLE 5 TITLES	39.42
CDW CD-ROM BUNDLE 5 TITLES	57.80
CDW CD-ROM ENTERTAINMENT BUNDLE	63.76
SHAPEWARE VISIO V1.1	194.03
SYMANTEC DESKTOP/WIN V2.0	52.80
SYMANTEC NORTON DOS WIN 6	52.80
STACKER V3.1 WINDOWS/DOS	95.83
STACKER FOR DSV V1.0	121.05



COREL SYSTEMS DRAW V4.0

ONLY $384.40

29312

SWIFTE LETTERHEAD FOR WORD	36.79
SYMANTEC AMI PRO WIN/DOS V3.0	98.53
SYMANTEC PC ANYWHERE V4.5	83.20
SYMANTEC PC ANYWHERE 5.5 REMOTE	83.20
SYMANTEC NORTON SPECDACHE PLUS	57.08
SYMANTEC NORTON UTILITIES V6.0	57.08
SYMANTEC NORTON DESKTOP/WIN V2.0	66.44
SYMANTEC NORTON UTILITIES V7.0	112.71
SYMANTEC NORTON GUIDES FOR WIND	112.71
SYMANTEC Q&A 4.0	242.48
SYMANTEC Q&A LAN PACK 4.0 3 USER	303.14
TOUCHSTONE CHECK IT PRO	99.34
WORDPERFECT V6.0 DOS	173.46
WORDPERFECT V6.0 DOS LICENSE	173.46
WORDPERFECT DOS NODE WDOC	194.90
WORDPERFECT/WIN V6.0 LICENSE	205.22
WORDPERFECT/WIN V6.0 NODE WDOC	197.91
WORDPERFECT DOS V5.1	217.46
WORDPERFECT OFFICE SERVER V4.0	291.49
WORDPERFECT/WIN V6.0	281.49
WORDPERFECT/WIN V6.0 CLIENT	281.00
WORDPERFECT/WIN V5.2	281.47
WORDPERFECT/WIN V5.2	279.92
WORDPERFECT/WIN V5.0 LICENSE	189.90
WORDPERFECT/WIN V5.0 COMP UPG	189.90
WORDPERFECT DOS V6.0 COMP UPG	152.84
WORDPERFECT/WIN V5.2 COMP UPG	152.46
WORDPERFECT/WIN V6.0 COMP UPG	117.71
WORDPERFECT V6.0 LICENSE UPG	79.20
WP OFFICE V4.0 CLIENT PK UPG	134.76
WP PRESENTATIONS V2.0 UPG	79.90

CDW HOURS
Sales:7:30-7:30 CDT Mon-Fri, 7:30-5:00 CDT Sat.
TECHNICAL SUPPORT
6:00-7:00 CDT Mon-Fri, 7:00-5:00 CDT Sat.
(708) 291-7825

Prices are in effect at the time of publication and are subject to change without notice. Shipping and handling charges are not included. Shipping charges are based on the weight of the product and the shipping method you select. Shipping charges are not refundable. Sales tax is charged on all orders shipped to Illinois addresses. Sales tax is charged on the shipping charges if the product you order is taxable. Sales tax is not charged on tax exempt orders. Sales tax is not charged on shipping charges if the product you order is not taxable. Shipping charges are based on the weight of the product and the shipping method you select. Shipping charges are not refundable. Sales tax is charged on all orders shipped to Illinois addresses. Sales tax is charged on the shipping charges if the product you order is taxable. Sales tax is not charged on tax exempt orders. Sales tax is not charged on shipping charges if the product you order is not taxable. Shipping charges are based on the weight of the product and the shipping method you select. Shipping charges are not refundable. Sales tax is charged on all orders shipped to Illinois addresses. Sales tax is charged on the shipping charges if the product you order is taxable. Sales tax is not charged on tax exempt orders. Sales tax is not charged on shipping charges if the product you order is not taxable. Shipping charges are based on the weight of the product and the shipping method you select. Shipping charges are not refundable. Sales tax is charged on all orders shipped to Illinois addresses. Sales tax is charged on the shipping charges if the product you order is taxable. Sales tax is not charged on tax exempt orders. Sales tax is not charged on shipping charges if the product you order is not taxable.

©1992 CDW Computer Centers, Inc.

CDW

PCC768

FAX (708) 291-1737

WE SELL NAME BRAND ITEMS FOR LESS!

(800)-473-4CDW

NASDAQ

CDW® is a NASDAQ traded company
TICKER SYMBOL CDWC
D & B Rated 4A1 Duns 16-752-7952

Turn the Page For More CDW® Savings.

No Surcharge For Credit Cards

VISA MasterCard

High Volume Bids Invited

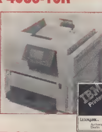
Circle 133 on reader service card.

COMPUTER DISCOUNT WAREHOUSE™

CDW

IBM / LEXMARK 4039-10R

Laser Printer



- ✓ 10 ppm, Up to 600 x 600 dpi
- ✓ 2MB RAM Standard
- ✓ Postscript Level 2, 39 Fonts
- ✓ HP PCL 5, 13 Fonts
- ✓ Automatic Switching Between Emulation Modes ✓ High-Performance Parallel Port and RS-232 Serial Port Standard
- ✓ Duplexing Option Available
- ✓ Optional Internal Network Adepters Available ✓ 200 Sheet Paper Capacity

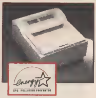
Lexmark 4039-10R **$1347.21** CDW 30611

WHY PAY RETAIL?

CDW® Sells For Less

OKIDATA OL400e LED Page Printer

The Perfect Personal Printer for Your Office



✓ 4 PPM ✓ 300 DPI ✓ 32 Bit RISC Chip ✓ 512 KB Expandable to 4 5 MBs
✓ HP LaserJet IIp+ Emulation
✓ Serial and Parallel Interfaces with Auto-Switching
✓ 100 Sheet Paper Tray ✓ 44 Bitmap Fonts ✓ Industry's Best Warranty: 5 Years on Printhead, 1 Year Pers/Labor on Printer
✓ Energy Star Certified

CDW® Price... ONLY **$508.51** CDW 30968

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

NETWORKING PRODUCTS

NOVELL

Netware V4.01

5 USER CD	889.00	100 USER CD	5599 00
10 USER CD	1988.00	250 USER CD	9997 00
25 USER CD	2894.00	500 USER CD	16833.71
50 USER CD	3899.00	1000 USER CD	30607.87

Netware V3.11

5 USER 3 5"	553.97	50 USER 3 5"	2466.00
10 USER 3 5"	1247.97	100 USER 3 5"	3499.00
20 USER 3 5"	1752.00	250 USER 3.5"	6397 44

SFT III V3.11

5 USER	1564.37	50 USER	4631 11
10 USER	2408.96	100 USER	6669 00
20 USER	3193.21	250 USER	11454.44

Netware V2.2

5 USER 3 5"	549.89
10 USER 3 5"	929.00
NETWARE LITE 1 USER	88.00
NETWARE LITE STARTER KIT	339.39
NETWARE LITE ADD-ON KIT	199.73
NE1000 ETHERNET COAX CARD	97.49
NE2000 PLUS ETHERNET COAX CARD	109.45
NE3200 EISA ETHERNET COAX CARD	679.12

THOMAS•CONRAD

TC8143 ETHERNET 10BT	559.62
TC5045 ETHERNET 10BT	209.46
TC5143 ETHERNET 10BT	97.59
TC5055 ETHERNET 8 PORT CON 10BT	322.74
TC6242 ARCNET 8 BIT COAX CARD	97.81
TC6245 ARCNET COAX CARD	179.86
TC6245 ARCNET COAX CARD 6PK	712.06
TC8242 ARCNET+ TP CARD	88.54
TC6245 ARCNET ALL-IN-ONE CARD	173.56
TC6040 ARCNET PASSIVE 4 PORT HUB COAX	86.20
TC6250 ARCNET ACTIVE 8 PORT HUB COAX	237.97
TC6050 ARCNET ACTIVE 16 PORT HUB COAX	513.31
TC8251 ARCNET 8 PORT SMART HUB COAX	449.10
TC6151 ARCNET 16 PORT SMART HUB COAX	559.97
TC4035 TOKEN RING 4MBPS CARD	289.89
TC4045 TOKEN RING 16/4 CARD	359.44
TC4046 TOKEN RING 16/4 MCA CARD	399.01
TC4050 16 PORT MAU STP	929.67
TCNS 100MBPS COAX CARD	429.55
TCNS 100MBPS EISA COAX CARD	609.91
TCNS 100MBPS STP CARD	449.92
TCNS 100MBPS FIBER OPTIC CARD	705.66
TCNS 100MBPS 6 PORT SMART HUB COAX	1352.74
TCNS 100MBPS 8 PORT SMART HUB COAX	1138.97
TCNS 100MBPS 8 PORT SMART HUB STP	1169.75
TCNS 100MBPS 8 PORT SMART HUB FIBER	1451.29

ARTISOFT

2MBPS ETHERNET CARD	129.86
AE1/T ETHERNET 10BT CARD	127.86
AE2 ETHERNET COAX CARD	199.05
AE2/T ETHERNET 10BT CARD	197.00
AE3 ETHERNET COMBO CARD	224.68
NODERUNNER 2000A	217.34
NODERUNNER 2000T	176.47
NODERUNNER 2000C	176.47
NODERUNNER 2000M/TC	249.30
CENTRAL STATION	389.23
10BT 5 PORT INTERNAL HUB	267.33
AE2 STARTER KIT	444.44
AE2 STARTER KIT WINDOWS	509.28
NODERUNNER STARTER KIT WINDOWS	499.57
LANTASTIC AI V5 0	79.89
LANTASTIC AI V5 0 6 USER	438.30
LANTASTIC AI V5 0 WINDOWS	92.59
LANTASTIC SOFTWARE	68.26
LANTASTIC FOR WINDOWS SW	129.68
ARTICOMM SOFTWARE	255.91
T-RUNNER 8 PORT 10BT	289.46
T-RUNNER 12 PORT 10BT	489.41

SMC

ULTRA 18 BIT ETHERNET COAX	105 25
ULTRA 16 BIT ETHERNET 10BT	105.25
ULTRA 16 BIT ETHERNET COMBO	124.35
ETHERCARD+ ELITE 8 BIT COAX	95.66
ETHERCARD+ ELITE COAX	119 50
ETHERCARD+ ELITE COAX 6PK	654 59
ETHERCARD+ ELITE MCA COAX	185.64
ETHERCARD+ ELITE 10BT	119 50
ETHERCARD+ ELITE 10BT 6PK	623.43
ETHERCARD+ ELITE MCA 10BT	185 93
ETHERCARD+ ELITE EISA 10BT	574 78
ETHERCARD+ ELITE COMBO	143 57
ETHERCARD+ ELITE COMBO 6PK	754 89

NETWORKING PRODUCTS

3008 ETHERNET CARD 10BT	99.81
3016 ETHERNET CARD COAX/ 10BT	128.06/124.13
3608 ETHERNET 8 PORT CON 10BT	324.81
3512 ETHERNET 12+2 PORT CON 10BT	804.76
3402 TRANSCEIVER AUI/BNC	137.60
3402 TRANCEIVER AUI/TP	107.76
PC600WS ARCNET CARD COAX	125.93
PC650WS ARCNET CARD TP	119.88
PC600FS ARCNET CARD COAX	199.29
PC130 ARCNET CARD COAX	68.50
PC130E ARCNET CARD COAX	99.00
ARCNET 8 PORT ACTIVE HUB COAX	226.41

3Com

3C503 ETHERLINK II 8 BIT COAX	188.41
3C503 ETHERLINK II COAX	159.84
3C503 ETHERLINK II 10BT	172.82
3C509 ETHERLINK III COAX	123.37
3C509 ETHERLINK III COAX 5 PK	521.52
3C509 ETHERLINK III 10BT/ 5 PK	129.80/529.24
3C509 ETHERLINK III MCA 10BT	238.05
3C509 ETHERLINK III COMBO/ 5 PK	139.98/575.91
3C579 ETHERLINK EISA COAX	229.91
3C579 ETHERLINK EISA 10BT	229.91
3C1627 12 PORT LINKBUILDER 10BT	919.36
3C507 Ethernet Card	279.61
3C509 Etherlink III 10BASE-T	133.25
3C509 Etherlink III Coax/ Combo	129.71/ 140.48
3C619 Tokenlink III 4/16 10pk	3999.43

Xircom

PE310BC POCKET ETHERNET COAX	309 16
PE310B2 POCKET ETHERNET COAX	275 56
PE310BT POCKET ETHERNET 10BT	279 31
PA202B6 POCKET ARCNET COAX	236 30
PA202BT POCKET ARCNET TP	234.90
PT216BT POCKET TOKEN RING 16/4	529.44
PT216B3 POCKET TOKEN RING 16/4	527 08
POCKET ETHERNET PRINT SERVER COAX	304 97
ET16BU EXTERNAL TOKEN RING 16/4	609 93
PPX03 PARALLEL PORT MULTIPLEXOR	79 80

TAPE, REMOVABLE & FLOPPY DRIVES

COLORADO MEMORY SYSTEMS INC.

JUMBO 120MB INTERNAL	144.37
JUMBO 250MB INTERNAL	176.74
TRAKKER 120MB PARALLEL PORT	289.56
TRAKKER 250MB PARALLEL PORT	347.97
POWERTAPE 2GB SCSI INT/ EXT	930.27/1119.86
POWERDAT 2GB SCSI INTERNAL	1500.24

I•MEGA

TAPE 250MB INSIDER 1"	197.62
TAPE 250MB INSIDER HH	205.41
FLOPTICAL 21MB INSIDER	359.86
FLOPTICAL 21MB PC POWERED	395.65
BERNOULLI 90MB PC POWERED	454.38
BERNOULLI 150MB INSIDER	466.09
BERNOULLI 150MB PC POWERED	513.59
BERNOULLI 150MB TRANSPORTABLE	589.26

SUMMIT

SE120 120MB INT TAPE B-U	139.07
SE250 250MB INT TAPE B-U	174.63
SE305 305MB INT TAPE B-U	239.90

MICROSOLUTIONS

BACKPACK 3 5" 1 44MB FLOPPY PARALLEL	178.51
BACKPACK 5 25" 1 2MB FLOPPY PARALLEL	178.51
BPACK 100MB/ 200MB HD PARALLEL	379.59/459.59
BACKPACK CD-ROM PARALLEL	351.75

SyDOS

PRO NOTE 42MB PARALLEL	519.88
PUMA 88MB PARALLEL	443.39
MARLIN 105MB INT IDE	528.01
88MB INT SCSI W/ADPT	592.76
88MB EXT SCSI W/ADPT	490.95

Mountain

TD-250 250MB INT IDE	207.35
FS8500 305MB INT IDE	442.09
1200-4 4GB INT SCSI	1799.88
1200-4 4GB EXT SCSI	2010.41

IRWIN

A CONNER PERIPHERALS Company

EZ-PORT 120MB PARALLEL	329.97
EZ-PORT 250MB PARALLEL	339.97
A250PC 250MB INT	169 39

NETWORKING PRODUCTS

IBM TOKEN RING

IBM TOKEN RING 16/4 ISA	493.26
IBM TOKEN RING 16/4 MCA	649 89
IBM TOKEN RING MAU	458 88

INTEL NETWORKING

ETHEREXPRESS 16 COAX	99.49
ETHEREXPRESS 16 COAX 5 PK	454 13
ETHEREXPRESS MCA COAX	166 90
ETHEREXPRESS 16 10BT/ 5 PK	99.49/479 79
ETHEREXPRESS MCA 10BT	166 90
ETHEREXPRESS 16 COMBO	114.14
ETHEREXPRESS FLASHC COAX	131 61
ETHEREXPRESS FLASHC COAX 5 PK	627 12
ETHEREXPRESS EISA COAX	398 36
ETHEREXPRESS EXPANSION HUB 10BT	443 20
TOKENEXPRESS 16/4	399 53
NETPORT II COAX/ 10BT	358 97/358.97

WYSE TERMINALS

WYSE 30 AMBER OR GREEN	279.51
WYSE 50 AMBER OR GREEN	355 50
WYSE 60 AMBER, GREEN, WHITE	279.60
WYSE 150 AMBER, GREEN, WHITE	268 50
WYSE 160 AMBER, GREEN, WHITE	329 82
WYSE 185 AMBER, GREEN, WHITE	320 22
WYSE 325 COLOR	519 93
WYSE 370 COLOR	779 34

MULTIMEDIA SOUND CD

ALTEC LANSING ACS300 SPKRS/SW	269 26
CDW 5 CD BUNDLE	129 00
CDW 5 CD BUSINESS BUNDLE	119 86
CDW 5 CD ENTERTAINMENT BUNDLE	79 33
ARISTASOFT WIRED FOR SOUND PRO	39.49
ATI CD SOUND DIMENSION	385 83
CREATIVE LABS EDUTAINMENT 8 INT	483 19
CREATIVE LABS EDUTAINMENT 16 INT	526 65
CREATIVE LABS EDUTAINMENT 16 EXT	595.14
CREATIVE LABS DISCOVERY 16 INT	469 81
CREATIVE LABS MULTIMEDIA STARTER INT	449 58
CREATIVE LABS SOUND BLASTER DELUXE	84.95
CREATIVE LABS SOUND BLASTER PRO	125.48
CREATIVE LABS SOUND BLASTER 16 ASP	219 79
LOGITECH SOUNMAN 16	109 44
MEDIAVISION PRO AUDIO SPECTRUM 16	149 64
MEDIAVISION PRO AUDIO STUDIO 16	208 99
MEDIAVISION PRO 16 SYSTEM II BUNDLE	874 58
MICROSOFT MULTIMEDIA BEETHOVEN	49.50
MICROSOFT BOOKSHELF CD	119 20
ORCHID SOUND PRODUCER	116 24
PROCOM INT MULTIMEDIA STATION	731 84
PROCOM EXT MULTIMEDIA STATION	781.54
SONY DSKTOP LIBRARY INT W/SND	563 12
SONY DSKTOP LIBRARY INT NO SOUND	347 11
SONY DSKTOP LIBRARY EXT W/SND	537 87
TURTLE BEACH 16 BIT MULTIBUNDLE	666 84
TURTLE BEACH MULTISOUND	505 62
TURTLE BEACH WAVE SW	73 31
TEXEL INT BUSINESS BUNDLE	537 88
TEXEL EXT BUSINESS BUNDLE	605 25
TEXEL INT CONSUMER BUNDLE	CALL
TEXEL EXT CONSUMER BUNDLE	CALL
TEXEL INT EDUCATION BUNDLE	CALL
TEXEL EXT EDUCATION BUNDLE	CALL
TEXEL INT MULTIMEDIA BUNDLE	CALL
TEXEL EXT MULTIMEDIA BUNDLE	CALL
TEXEL INT CD-ROM W/PAS 16	CALL
TEXEL EXT CD-ROM W/PAS 18	CALL

CD-ROM & OPTICAL DRIVES

ACCULOGIC PARALLEL PORT CD-ROM	499 50
HITACHI 3700 INT CD-ROM	402 00
HITACHI 3750 SCSI INT CD-ROM	399 85
HITACHI 1700SSA EXT CD-ROM	465.95
HITACHI 1750 SCSI EXT CD-ROM	502.79
MICRO DESIGN DUAL CD-ROM DRIVE	1206 70
NEC CDR38 PORTABLE CD-ROM	269 44
NEC CDR84-1 INTERNAL CD-ROM	449 31
NEC CDR74-1 EXTERNAL CD-ROM	459 31
PHILIPS CDD521CW RECORDABLE CD-ROM	5091 62
PIONEER DRM604X 6 DISC QUADRASPIN	1334 08
PROCOM 200MS INT SCSI CD-ROM	444.32
PROCOM 200MS EXT SCSI CD-ROM	548 60
SONY CDU31A INT CD-ROM	233 72
SONY CDU535 INT CD-ROM	279 83
SONY CDU54101 INT SCSI CD-ROM	416 85
SONY CDU7205N EXT CD-ROM	455.67
SONY CDU7211 EXT SCSI CD-ROM	535 20
SYDOS PARALLEL PORT CD-ROM	298 00
TEXEL INT DM3028 240MS	CALL
TEXEL INT DM3028 240MS W/ADPT	CALL
TEXEL EXT DM5028 240MS	CALL
TEXEL EXT DM5028 240MS W/ADPT	CALL
TOSHIBA 3401 INT SCSI CD-ROM	479 82
TOSHIBA 3401 INT SCSI CD-ROM W/ADPT	595 14
TOSHIBA 3401 EXT SCSI CD-ROM	557.14
TOSHIBA 3401 EXT SCSI CD-ROM W/ADPT	705 55
TOSHIBA 3401 EXT SCSI 4 DRIVE TOWER	2513.72

PLOTTERS, DIGITIZERS & SCANNERS

KURTA

IS/ONE 12 X 12 4 BUTTON	329.26
IS/ONE 12 X 12 12 BUTTON	329.29
XLP 12 X 12 4 BUTTON & STYLUS	239.90
XLP 12 X 18 16 BUTTON	479.68
XGT 12 X 12	399.90

CalComp

12 X 12 4 BUTTON	279.88
12 X 12 16 BUTTON	279.89
12 X 12 4 BUTTON CORDLESS	279.88
12X12 16 BUTTON CORDLESS	279.88
12 X 12 W/PRESSURE TIP PEN	279.88
12 X 18 16 BUTTON	464.03

Summagraphics

SUMMASKETCH III 12 X 12 4 BUTTON	295.45
SUMMASKETCH III 12 X 12 16 BUTTON	295.95
SUMMASKETCH III 18 X 12 4 BUTTON	524.44

HOUSTON INSTRUMENT

HI V100 INKJET PLOTTER	1892.88
HI 7100 A-D SIZE 8 PEN	2640.59
HI 7200 A-F SIZE 8 PEN	3466.59

HEWLETT PACKARD

HP SCANJET IIP	722.28
HP SCANJET IIP DOCUMENT FEEDER	269.93
HP SCANJET IIC	1269.22
HP SCANJET IIC DOCUMENT FEEDER	486.59
HP DESIGNJET 600 A-D SIZE	5514.79
HP DESIGNJET 600 A-E SIZE	6095.26
HP 7475A	1295.88
HP DRAFTPRO PLUS A-D SIZE	3083.24
ES600C PARALLEL	799.67
ES600C SCSI	839.87
ES600C ACTION SCANNER	786.88
ES800C PARALLEL/SCSI	1089.81

VIDEO PRODUCTS

VGA & SUPER VGA MONITORS

AST VISION 4N 14"	389.91
AST VISION 4L 14"	399 95
AST VISION 7L 17"	881 51
MAG INNOVISION MX15F	527 97
MAG INNOVISION MX17F	947 89
MAGNAVOX CM2079 14" 39	239 49
MAGNAVOX CM2089 14" 28	285.14
MAGNAVOX CM9217 17"	742.79
MAGANAVOX 20CM64 20"	1164 08
NANAO F340IW 15"	708 85
NANAO F550I 17"	1070 95
NEC 3FGE 15"	589 00
NEC 4FGE 15"	689 00
NEC 5FGE 17"	1059 00
NEC 6FG 21"	2269 00
PANASONIC C1381i 14"	325 76
PHILIPS 1557AS 15"	509 89
PHILIPS 1764DC 17"	945 94
SEIKO CM1760LR 17"	940 82
SONY CPD1430 14"	599.99
SONY CPD1730 17"	1019.48

VGA & SUPER VGA DISPLAY CARDS

ACTIX ULTRA PLUS 1MB	231.38
ACTIX ULTRA PLUS 2MB	299 31
ADS VGA TO TV ELITE	267 65
ADS VIDEO CLIPPER	332 69
ADS PC PRIME TIME	369 53
AI TECH PRO PC TV PLUS	306.13
AI TECH PRO VGA TV PLUS	595.01
ATI GRAPHICS ULTRA+ 2MB	243.53
ATI GRAPHICS ULTRA PRO 2MB	362 62
ATI GRAPHICS ULTRA PRO 2MB EISA	397 17
ATI GRAPHICS ULTRA PRO 2MB MCA	397 17
ATI VGA WONDER XL24	124.15
ATI VANTAGE 1MB	159 61
CREATIVE LABS VIDEO BLASTER	333.85
CREATIVE LABS VIDEO SPIGOT	423.86
DIAMOND STEALTH PRO 1MB	253 59
DIAMOND STEALTH PRO 2MB	339 61
DIAMOND SPEEDSTAR PRO 1MB	119 64
DIAMOND VIPER VLB 2MB	408.83
HERCULES GRAPHITE 1MB	229 26
HERCULES GRAPHITE 2MB	403 45
HERCULES DYNAMITE VLB	169 27
INTEL SMART VIDEO RECORDER	478 98
ORCHID FAHRENHEIT 1280+	159 62
ORCHID FAHRENHEIT VA	176 16
ORCHID CELSIUS VLB 1MB	228 12

FOR $UPER $AVINGS ON $OFTWARE, TURN THE PAGE

NASDAQ

BUY WITH CONFIDENCE CDW® IS A NASDAQ TRADED COMPANY
TICKER SYMBOL CDWC
D & B Rated 4A1
Duns 10-762-7952

No Surcharge For Credit Cerds

VISA DISCOVER MasterCard CDW

Credit Card charges are not submitted until time of shipment. Freight is calculated as the carrier's actual freight charge plus insurance and packaging material The cost of insurance is 0 30% (0 0030) of the order total. Packaging materials will not exceed $4 00 per 1 package order or $8 00 per multi-package shipment. For your protection we ship only to your verified billing address. Non-defective returns subject to restocking fee. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. All pricing subject to change. ™ Trademarks of all companies listed in this ad

CDW® HOURS
Sales 7:30-7:30 CDT Mon-Fri.
9:00-5:00 CDT Sat.
Tech Support for Customers
8:00-7:00 CDT Mon-Fri.
9:00-5:00 CDT Sat.

MOST ORDERS SHIP THE SAME DAY

COMPUTER DISCOUNT WAREHOUSE™

COMPUTER DISCOUNT WAREHOUSE™

CDW

THE MAXTOR 7345A. ABOUT A BUCK A MEGABYTE.

3.5" 345MB, 14ms IDE/AT Interface with Write Cache

HOT!

Maxtor

CDW® Price...... **$325.69** CDW 28380

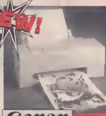
WHY SETTLE FOR LESS?

CDW® SERVICES YOU BETTER

CANON BJC-600 NEW!

Color Bubblejet Printer

- ✓ 360 dpi ✓ 240 cps
- ✓ Individual Color Cartridge System: Less Waste
- ✓ 100 Sheet Feeder
- ✓ Laser Quality Text
- ✓ Optimized for Plain Paper Vibrant Colors Without Special Paper



Canon

CDW® Price..... ONLY **$598.50** CDW 32009

CDW® CARRIES OVER 15,000 PRODUCTS. IF YOU DON'T SEE IT, CALL!

COMPUTERS

TOSHIBA

T1900/120MB	1727.97	T4500C/120MB	2847 58
T1900/200MB	1977 97	T4500C/200MB	3097 96
T1900C/120MB	2369.97	T4600/120MB	2789 41
T1900C/200MB	2614 85	T4600/200MB	3009 24
T1950/120MB	2142 59	T4600C/120MB	3927 32
T1950C/120MB	2737 11	T4600C/200MB	4177.70
T1950/200MB	2395 57	T4600C/340MB	4595 01
T1950C/200MB	2993 27	T6600C/510MB	8378 26
T4500/120MB	1997 97	T6600C/510MB CD	6875.00
T4500/200MB	2148 84	T6600C/510MB CD/DVI	7869.57

AST

BRAVO 4/33D 120HD,4MB	1280.85
BRAVO LC 4/25S/ 4/33S 120HD,4MB	1033.7/11203.30
BRAVO LC 120HD,4MB	
BRAVO LC 4/33D 120HD/ 210HD	1279.33/1503.97
BRAVO LC 4/50D 120HD/ 210HD	1530.30/1760.09
BRAVO LC 4/66D 120HD/ 210HD	1795.58/2039.56
BRAVO LP 4/25S 170HD/ 340HD	1176.27/1592.27
BRAVO LP 4/33D 170HD/ 340HD	1431.28/1857.46
BRAVO LP 4/66D 170HO/ 340HD	1935.16/2374.73
BRAVO MT 4/33O 170HO/ 340HD	1503.87/1935.16
BRAVO MT 4/66D 170HO/ 340HD	2023.08/2462.64
POWEREXEC 4/25 200HO MONO SPECIAL	2391.16
POWEREXEC 4/25 200HO COLOR SPECIAL	3050.84

Canon

NOTEJET 4/25 85MB/ 135MB	2300.21/2529.59
NOTEJET 4/25 180MB	2749.65
INNOVA 4/25L SX 170HO	1061.71
INNOVA 4/33L SX 170HD	1149.84
INNOVA 4/33L OX 170HD	1368.72
INNOVA 4/66L OX2 170HD/ 240HO	1613.26/1723.76

DTK Gràfika

GRAFIKA 4/25S 4MB 120MB	1074.28
GRAFIKA 4/33S 8MB TOWER 170MB HD	1390.81
GRAFIKA 4/33 4MB 200MB HD VESA	1453.04
GRAFIKA 4/33 8MB OESKTOP NO HO	1284.92
GRAFIKA 4/33 8MB DESKTOP 240MB HO	1649.63
GRAFIKA 4/33 8MB TOWER NO HD	1312.85

NEC

VERSA 4/25 120MB MONO/ COLOR	2680.23/3752.97
VERSA 4/25 180MB MONO/ COLOR	2926.59/3990.33
VERSA 4/33 180MB MONO/ COLOR	3195.82/4259.56
VERSA 4/33 180MB COLOR OFFICE	4979.12/3993.41
VERSA 4/33 250MB MONO/ COLOR	5323.06
REAOY ES 4/25 170MB	1037.16

TEXAS INSTRUMENTS

TM4000E 4/25S 120MB MONO new	1879.11
TM4000E 4/25 120MB AOVANCEO COLOR	2128.79
TM4000 4/25O 120MB MONO	2079.61
TM4000 4/40 200MB COLOR	3290.72
TM4000 4/50 120MB/ 200MB MONO	2847.97/2987.97
TM4000E 4/50 200MB ACTIVE COLOR	3869.79

DOT MATRIX & LASER PRINTERS

OKIDATA

ML320	299.12	ML520	365.11
ML320 MICROLINE	299.12	ML521	488.92
ML321	421.56	ML590	416.20
ML321 MICROLINE	421.56	ML591	567.57
ML380	209.52	OL400E	508.51
ML395	966.97	OL810	905.50
ML395C	1016.74	OL830+	1080.98

Canon

BJ10EX W/FREE SHEET FEEDER	237.97
BJ200*	268.12
BJ230	409.85
BJC600 COLOR	598.50

EPSON

AP2250	113.30	LO870	447 15
AP3250	173.15	LO1170	619 38
AP3260	199.99	LO2550	908.11
LX810	197.97	DFX5000	1309 12
FX870	263.10	OFX8000	2209 95
FX1170	348.22	STYLUS 300	321 52
LO570+	237.97	STYLUS 800*	289.00
LQ1070+	357.97		
ACTION LASER 1500	657.97		
ACTION LASER 1500 W/2MB	717.97		

*After $50 Manufacturer's Rebate

NEC

P3200	227 78	Silentwriter 95F	679 90
P3300	315 85	Silentwriter 95FX	1089.95
P6200	410.99	Silentwriter 97	1062 43
P6300	612.97	Silentwriter 97FX	1275 90
P9300	861 19	Silentwriter 1097 NEW	1389 01
Jetmate 1000	309 59	LC890 Color	999 68
Superscript 610 NEW	631.87		

DOT MATRIX & LASER PRINTERS

Panasonic

1150	136.43	2180	157.97
1624	339.44	2624	385.48
1695	359.82	4410 LASER	519.09
2023	197.97	4430 LASER	662 95
2123	236.09	4440 LASER	1217.85
2124	312.63		

TEXAS INSTRUMENTS

MICROWRITER BASIC/ PS35	521.46/665.90
MICROLASER PRO PS23 NEW	1375.82
MICROWRITER PS65	956.90
MICROLASER PRO PS65 NEW	1547.25
MICROMARC INKJET	292.13

HEWLETT PACKARD

Deskjet Port	390.53	Paintjet XL300	2249.39
Deskjet 500	319.89	Laserjet 4L	689 67
Deskjet 500C	409.46	Laserjet 4ML	1099 59
Deskjet 550C	580.95	Laserjet 4	1389.45
Deskjet 1200C	1419.97	Laserjet 4M	1929 35
Deskjet 1200C PS	1928.96	Laserjet 4SI	2988 95
Paintjet Parallel	576.64	Laserjet 4SI MX	4483.70
Paintjet XL	736.84		

IBM LEXMARK

LEXMARK 4019E 5PPM	747.97
LEXMARK 4029-10/ 10R 10PPM	1127.97/1347.21
LEXMARK 4039-10RD 10PPM DUPLEX	1647.97
LEXMARK 4039-12R/ 12L 12PPM	1697.97/2414.02
LEXMARK 4039-16L 16PPM	2742.61

HARD DRIVES & CONTROLLERS

Maxtor

7131A 131MB IDE	189.04	7345S 340MB SCSI	361.80
7213A 213MB IDE	236.47	LXT540A 540MB IDE	766.53
7213S 213MB SCSI	248.86	LXT540S 540MB SCSI	816.51
7245A 245MB IDE	271.16	PO12S 1 02GB SCSI	964 80
7245S 245MB SCSI	250.82	PO17S 1 4GB SCSI	1182.86
7345A 340MB IOE	325.69	1240S 1 24GB SCSI	1205.71

MICROPOLIS

MCP2205 584MB SCSI	730.93
MCP1624 668MB SCSI	690.85
MCP2210A 1050MB IOE	959.89
MCP2210 1050MB SCSI	1022.86
MCP1528 1 3GB SCSI	614.29
MCP2217 1 7GB SCSI	1439.00
MCP1548 2 0GB SCSI	1314.28
MCP1926 2 15GB SCSI	1806.31
MCP1936 3GB SCSI	2406.78

CONNER

CP30084E4 84MB IOE	175.64
CP30104H 120MB IOE	198.92
CP2124 121MB IOE	324.57
CP30174 174MB IDE	206.90
CP30204 210MB IDE	233.33
CP30200 212MB SCSI	295.58
CP30254H 250MB IOE	252.82
CP30344M 340MB IDE	339.77
CP3504 510MB IDE	789.24
CP30544 540MB IOE	694.92
CP30540 540MB SCSI	717.86
CP31370 1 37GB SCSI	1050.95

Quantum

HARDCARO EZ 42MB/ 85MB	192.42/227.83
HARDCARD EZ 127MB/ 240MB	264.22/416.63
LPS240AT PROORIVE 240MB IDE	294.22

Seagate

ST2511 42MB MFM	236.46
ST351A/X 42MB IOE	103.70
ST3120A 106MB/ 130MB IDE	175.88/173.49
ST3243A 200MB/ 245MB IDE	221.35/316.38
ST3283N 248MB SCSI	343.40
ST3290A 261MB IDE	315.60
ST33990A 341MB IDE	349.88
ST3550A 452MB IDE	476.00
ST4766E 766MB ESOI	999.95
ST11200N 1 05GB SCSI	975.37
ST41200N 1 05GB SCSI	879.29
ST41650N 1 42GB SCSI	1238.98
ST42100N 1 9GB SCSI	1481.92
ST43400N 3.4GB SCSI	2497.18

CONTROLLERS

ACCULOGIC IOE	22.96
ACCULOGIC IDE W/1PAR, 2SER, 1GAME	34.03
ACCULOGIC IOE W/BIOS	47.48
AOAPTEC 1522/ 1542C SCSI KIT	145.45/253.80
ULTRASTOR 24F EISA SCSI	405.85
ULTRASTOR 34F LOCAL BUS SCSI	293 86

MODEMS & COMMUNICATIONS

USRobotics

Sportster 2400 Ext	94.12	Sportster 14 4 INT	157.48
Sportster 9600 Int	147.50	Sportster 14 4 I FAX	174 50
Sportster 9600 FAX	159.81	Sportster 14 4 Ext	179.50
Sportster 9600 Ext	155.53	Sportster 14 4 E FAX	197.28
Sportster 9600 FAX	169.95		

Worldport 9696 Ext W/FAX	272.47
Worldport 14.4 W/FAX	316.77
Courier 2400 V 42BIS Ext	251.25
Couner 14 4 V 32BIS INT/ W/FAX	157.48/322.32
Couner 14 4 V 32BIS Ext / W/FAX	361.07/388.31
Courier 16 8 HST Ext	464.49
Courier Dual Std Ext	974.50
Couner DUAL STD INT/ Ext W/FAX	653.19/705.90

Hayes

ACCURA 2400B INT	59.96	OPTIMA 24E FAX	119.90
ACCURA 2400 EXT	69.82	OPTIMA 9600 Ext	334.63
ACCURA 24EC FAX	92.81	OPTIMA 96 FAX	348.33
ACCURA 96 FAX	174.74	OPTIMA 96 E FA	348.33
ACCURA 96E FA	196.43	OPTIMA 14 4 Ext	363.17
ACCURA 14 4FAX	197.73	OPTIMA 14 4E FAX	376.86
ACCURA 14 4E FAX	219.27	OPTIMA 14 4 Pocket	296.93
Pocket Edition 2400	69.50	ULTRA 9600 EXT	556.16
OPTIMA 2400E	112.19	ULTRA 14 4 EXT	613.56

PRACTICAL PERIPHERALS

PM14400FX 14 4 INT W/FAX	190.52
PM14400FXMT 14 4 EXT W/FAX	197.28
PM14400FXSA 14 4 EXT W/FAX, LCO	374.43
PM14400FXP 14 4 POCKET W/FAX	338.90
FAXME FOR HP	115.70

intel

Satisfaction 100	99.90	Satistaction 350	309.98
Satislaction 200	289.85	Satislaction 400	387.52
Satislaction 300	227.27	Satislaction 400E	387.52

INTEL 2400 V 42BIS Int	129.88
INTEL 2400 V 42BIS EXT	140.96
INTEL 9600 INT W/FAX	152.48
INT 14 4 INT W/FAX	190.82
INTEL 14 4 EXT W/FAX	197.28

MULTI-TECH

MT224BA 2400 EXT W/FAX	242.56
MT932BA 9600 EXT W/FAX	399.95
MT1432BA 14.4 EXT W/FAX	436.28

MATH COPROCESSORS

INTEL 287XL	69.62
INTEL 387SX 16/20/25MHZ	83.22
INTEL 387SX 33MHZ	90.03
INTEL 387SL	83.44
INTEL RAPIDCAO	236.88

BATTERY BACKUP AND UPS

SMART LITE

BC250	97.91	OMNI 1250 LAN	589.89
BC400	155.55	UNISON 600	499 95
BC500	187 76	UNISON 1200	1074 96
BC500 LAN	195.59	SPIKESTIK 6	13.84
BC600 LAN	249 90	SPIKEBAR 6	24 91
BC750 LAN	308 20	SUPER 7	18.14
BC900 LAN	354 46	LS600	79.97
BC1250 LAN	449.59	LS604	93 98
OMNI 450 LAN	264 42	LC1200	144 89
OMNI 600 LAN	309 89	LC1800	188.81
OMNI 750 LAN	395 93	LC2400	228.40

AMERICAN POWER

BACK UPS 250	98 13	SMART UPS 400	295.21
BACK UPS 400	157.26	SMART UPS 600	356 78
BACK UPS 450	192 94	SMART UPS 900	581.55
BACK UPS 600	258 94	SMART UPS 900XL	1104.24
BACK UPS 900	377.65	SMART UPS 1250	702.24
BACK UPS 1250	490.67	SMART UPS 2000	1173.34
SURGEARREST	17.90		
SURGEARREST PLUS	38.08		
SURGEARREST PLUS W/TEL	49.94		
LINE-R 600	115 87		
LINE-R 1250	158 09		

MICE

LOGITECH DEXXA SERIAL MOUSE	26 58
LOGITECH MOUSEMAN COMBO	49 81
LOGITECH MOUSEMAN CORDLESS	89.93
LOGITECH TRACKMAN II	79 96
LOGITECH TRACKMAN PORTABLE	76 93
LOGITECH FOTOMAN PLUS	544.76
MICROSOFT MOUSE V2 0 SERIAL	78 63
MICROSOFT MOUSE V2.0 W/WIN 3.1 COMBO	149 96
MICROSOFT MOUSE V2 0 BUS	86 96
MICROSOFT BALLPOINT MOUSE	115 32
MICROSOFT BALLPOINT MOUSE W/WIN 3 1	149.18
POINTEX MOUSE W/HP DASHBOARO	49.63

KINGSTON MEMORY

AST BRAVO 386SX 8MB	CALL
AST BRAVO 486LC 2MB	CALL
AST POWEREXEC 486 4MB	CALL
AST PREMIUM 386SX 2MB	CALL
AST PREMIUM 486/33 8MB	CALL
AST PREMIUM 4MB	CALL
AST PREMIUM II 1MB CUPID SIMM	CALL
AST PREMMIA 16MB	CALL
AST PREMMIA 8MB UPG	CALL
COMPAQ 8 SOCKET EXP W/8MB	CALL
COMPAO 8MB DP 486/33M	CALL
COMPAQ CONTURA 3/20 8MB	CALL
COMPAO CONTURA 486 8MB	CALL
COMPAO CONTURA 4MB	CALL
COMPAO DP 386/16 4MB	CALL
COMPAO DP 386/20E 4MB	CALL
COMPAQ DP286N 386N 4MB	CALL
COMPAQ DP386/20E&25E 4MB	CALL
COMPAO DP386/33 2MB	CALL
COMPAO DP386SX/16 4MB	CALL
COMPAQ DP386SX/18 4MB	CALL
COMPAO LITE 4/25C 4MB	CALL
COMPAO LITE 4/25C 8MB	CALL
COMPAO PORTABLE III 2MB	CALL
COMPAO PROLINEA 3/25S 2MB	CALL
COMPAQ PROLINEA 486/33 4MB	CALL
COMPAO PROLINEA 486/33 8MB	CALL
COMPAO PROSIGNIA 16MB	CALL
EPSON ACTION LASER 2-8MB	CALL
HP DESKJET 500 & 500C 256KB	CALL
HP LASER 4L 1MB MEM UPG	CALL
HP LASERJET 2P/III 1MB	CALL
HP LASERJET 2P/III 2MB	CALL
HP LASERJET 3SI 4MB	CALL
HP LASERJET 4 2MB	CALL
HP LASERJET 4 4MB	CALL
HP LASERJET 4 8MB	CALL
HP LASERJET II & IID 2MB	CALL
HP LASERJET II & IID 4MB	CALL
HP PAINTJET XL300 4MB	CALL
HP PAINTJET XL300 8MB	CALL
HP VECTRA 486 4MB	CALL
IBM 55SX 4-16MB	CALL
IBM MOO30 2MB	CALL
IBM PS/1 2MB	CALL
IBM PS/2 50 2MB	CALL
IBM PS/2 55SX 4MB	CALL
IBM PS/2 70 4MB	CALL
IBM PS/2 70-061 2MB	CALL
IBM PS/2 70-A21 2MB	CALL
IBM PS/2 90 4MB	CALL
IBM THINKPAO 700 4MB	CALL
IBM THINKPAD 700 8MB	CALL
NEC SILENTWRITER 95 2MB	CALL
NEC VERSA 4MB	CALL
NEC VERSA 8MB	CALL
OKILASER 400 2MB	CALL
OKILASER 800 2MB	CALL
PANASONIC 4410, 4430 2-4MB	CALL
PANASONIC P4450I 2MB	CALL
TI MICROLASER 1MB	CALL
TI MICROLASER 4MB	CALL
TI TM4000 4MB	CALL
TOSHIBA 1800, 1850, 2000SX/E, 2200SX 2MB	CALL
TOSHIBA 1800 1850, 2000SX/E, 2200SX 4MB	CALL
TOSHIBA 1900C,4500C,4600C 8MB	CALL
TOSHIBA 3300SL 2MB	CALL
TOSHIBA 3300SL 4MB	CALL
TOSHIBA 4400, 4400SX/C 4MB	CALL
TOSHIBA 5200 2MB	CALL
TOSHIBA T1200XE 2MB	CALL
TOSHIBA T1800, 1850, 2000SX/E, 2200SX 8MB	CALL
TOSHIBA T3200SX 4MB	CALL

Due to an Industry-Wide Memory Shortege, Please Call COW lor the Best, Most Current Pricing and Availability Informetion

PRICES ARE RISING-PLEASE CALL TDDAY!

ACCELERATOR/OVERDRIVE

CYRIX 486ORX/2 UPGRADE	296.56
INTEL OVERDRIVE 16/20MHZ	319 77
INTEL OVERDRIVE 25MHZ	430.55
INTEL OVERDRIVE 33MHZ	545 90
KINGSTON SX/NOW 25MHZ	189 45
KINGSTON SX/NOW 33MHZ	196.25
KINGSTON 486/NOW 25MHZ	348 78
KINGSTON 486/NOW 33MHZ	539 25

D & B Rated 4A1
Duns 10-762-7952

CDW® Sells for Less and Services You Better!

(800) 473-4CDW

FAX (708) 291-1737

©1993 CDW® Computer Centers, Inc PCC768

IF YOU FIND A BETTER PRICE, CALL!

COMPUTER DISCOUNT WAREHOUSE™

Circle 134 on reader service card.

MEGA Value, Service, MEGAHAUS... Your

MEGA HAUS HARD DRIVES

Customer Advantage

- Unequaled Reputation
  Nobody knows drives like Megahaus. We have specialized in high quality storage solutions for over six years. Referals from satisfied customers are a high percentage of our business.

- Same Day Shipping
  Our multi-million dollar inventory offers you the best diversity and availability in the market. We ship most of our orders within 24 hours.

- Direct Replacement Warranty
  During the first year of your warranty we replace; not repair, your drive. Many of our competitors send your drive to the manufacture for repair, and you are without your drive for weeks. Our direct replacement warranty allows us to offer you a 24 hour turn around time.

- Lifetime Technical Support
  Our friendly factory trained technitions will support our products forever.

- Longevity
  During our six years in business we have seen many competitors come and go. Many have gone out of business due to poor and dishonest business practices. MegaHaus is a secure, honest company that will be here to service you for many, many more years to come.

- Fast, Easy Installation
  Most of our competitors do not add any value to the products that they sell. They get it in one door and ship it out the other door. The documentation included with their products is poor or not included at all. You are left to spend countless hours and headaches trying to get their products to work.
  MegaHaus does all the work for you. We spend endless hours researching the best possible solutions. When we have determinined the best drives, controllers, and software for each of our kits we put together our own precise quick installation guide. A short, to the point manual, not a 2" thick confusing manufactures manual. This quick installaion guide gives you the fastest, easiest installation available.

Thank you for your business!

Maxtor

Maxtor Drives feature the "No Quible Service Plan". If your drive fails under warranty they will ship you an advanced replacement drive. The MXT540 and MXT1240 are among the fastest drives made. With over 8 million drives sold, the M7000 series is one of the most reliable and mostdrives made.

IDE					
245MB	15ms	3600rpm	64K	M7245A*	$229
345MB	14ms	3600rpm	64K	M7345A*	$299
540MB	14ms	3600rpm	64K	M7540A*	$539
540MB	8.5ms	6300rpm	64K	MXT540A***	$729
SCSI					
245MB	15ms	3600rpm	64K	M7245S**	$264
340MB	14ms	3600rpm	64K	M7345S**	$329
545MB	8.5ms	6300rpm	256K	MXT540SL***	$759
1240MB	8.5ms	6300rpm	256K	MXT1240S***	$1129

Warranty * 1 year ** 2 year *** 3 year

Maxtor
Drives a Hard Bargain

Quantum™

Quantum 170, 240, & 525 feature a two year renewable warranty. If your drive fails within two years it will be replaced with a drive that has an additional two year warranty. PD models feature a five year warranty. Quantum is an incredible drive at a great price!

IDE					
170MB	17ms	3600rpm	32K	ELS170A	$175
240MB	16ms	4300rpm	256K	LPS240A	$230
525MB	10ms	4500rpm	512K	LPS525A	$585
SCSI					
170MB	17ms	3600rpm	32K	ELS170S	$183
240MB	16ms	4300rpm	256K	LPS240S	$239
525MB	10ms	4500rpm	512K	LPS525S	$585
700MB	10ms	4500rpm	512K	PD700S	$745
1050MB	10ms	4500rpm	512K	PD1050S	$865
1225MB	10ms	4500rpm	512K	PD1225S	$969
1800MB	10ms	4500rpm	512K	PD1800S	$1279

Specify Quality
Specify Performance
Specify Quanturn

WESTERN DIGITAL

Western Digital drives feature a three year warranty, The innovative Caviar drive models feature lightning fast seek times of less than 13ms, Cacheflow2 read and write disk caching for great performance, and 250,000 hours MTBF which means years of worry-free performance.

IDE					
212MB	13ms	3600rpm	64K	AC1210	$214
256MB	12ms	3322rpm	64K	AC2250	$233
341MB	12ms	3322rpm	64K	AC2340	$290
425MB	12ms	3322rpm	128K	AC2420	$389

Approximately The finest Caviar

CONNER

High quality has made Conner the drive of choice of most major manufactures such as Dell and Compaq. Conner is "The Storage Answer" with a full line of storage products including tape drives and hard drives. 340 & 1371MB feature a 2 year warranty.

IDE					SCSI				
250MB	14ms	4542rpm	32K	$230	340MB	13ms	4500rpm	32K	$329
340MB	13ms	4500rpm	32K	$309	540MB	10ms	5400rpm	256K	$619
540MB	10ms	5400rpm	256K	$599	1371MB	10ms	5400rpm	256K	$975

Ontrack

Data Recovery Software

Brings IDE Drive Owners an Amazing New Product! Drive Rocket IDE Drive Accelerator.

Drive Rocket software increases the data transfer rate of your drive 30 to 80%. We highly recomend this software for Maxtor, Quantum, Conner, Micropolis, and Fujitsu IDE hard drives. Installation is a snap. Performace benchmark utilities are included to show performance gains. Toll free support. Drive Rocket is a device driver that requires 3K of memory. *Try it, you will like it!*

Only $29
with any drive purchase

$39
purchased separately

Support, & Courtesy! Drive Company!

Seagate

Five year warranty. These new Barracuda drives are the fastest hard drives made. Drives are FAST SCSI-2, Wide SCSI available.

1689MB	8ms	7200rpm	1024K	ST11950N	$1759
2139MB	8ms	7200rpm	1024K	ST12550N	$2239

NEW! BARRACUDA

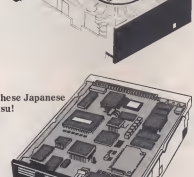
THE FASTEST FISH IN THE SEA IS NOW AVAILABLE FROM *Seagate*!

MICROPOLIS

Micropolis drives feature a five year advanced replacement warranty. If your drive fails within the warranty period they will ship you an advanced replacement.

IDE SALE!

IDE					
560MB	10ms	5400rpm	256K	MC2205A	$699
1050MB	10ms	5400rpm	256K	MC2210A	$889
1740MB	10ms	5400rpm	256K	MC2217A	$1299
SCSI					
560MB	10ms	5400rpm	256K	MC2205	$739
1050MB	10ms	5400rpm	256K	MC2210	$925
1740MB	10ms	5400rpm	256K	MC2217	$1349
2100MB	11ms	5400rpm	256K	MC1926	$1789
3020MB	11ms	5400rpm	256K	MC1936	$2239



FUJITSU

Fujitsu drives feature a five year warranty. These Japanese made drives are extremely dependable. You can depend on Fujitsu!

IDE					
520MB	12ms	4400rpm	256K	M2624T	$609
SCSI					
520MB	12ms	4400rpm	256K	M2624F	$609
1080MB	9.5ms	5400rpm	256K	M2694ESA	$899
2060MB	12ms	5400rpm	256K	M2654ESA	$1579

DEC

Five year warranty

1600MB	9.7ms	5400rpm	512K	DSP3160	$1159

IBM PS/1 & PS/2 DRIVES

Nobody knows PS/1 and PS/2 upgrades better than MegaHaus. Each kit is complete with everything you will need. IBM recommends and buys from MegaHaus, shouldn't you?

Capacity	PS/1 386 & 486	PS/2 25, 30, 30-286	PS/2 35 & 40	PS/2 50 thru 95
170MB	$239	$299	$229	$379
240MB	$309	$389	$299	$459
340MB	$389	$479	$379	$559
525MB	$739	$799	$729	$889
1050MB	n/a	$1159	n/a	$1229

120MB for PS/1 286 $589

HARD DISK CARDS

Hard drive and controller assembled as one unit. Saves a drive bay. Super easy installation. Requires only one card slot. Compatible with XT & AT compatibles, PS/2 30, and Tandy.

42MB	$199	210MB	$319	340MB	$439
170MB	$269	240MB	$339	525MB	$779

MegaHaus is a solution oriented company. We offer complete internal or external solutions for XT, AT ,PS/1, PS/2, Local Bus, EISA, MicroChannel, Macintosh, Sun, Printer Port, Tandy & others.

CONTROLLERS

Complete your drive purchase with one of these high quality controllers.

MODEL	Without Drive	With Drive
IDE		
MegaHaus		
8Bit ADP-50	$55	$40
16Bit IDEHDCT (2 hard drive, 2 floppy)	$29	$15
16Bit SUPERIO (2 hard, 2 floppy, 2 serial, 1 parallel)	$39	$22
Local Bus (4 hard, 2 floppy, 2 serial, 1 parallel)	$75	$62
DTC		
EISA 2290 (4 hard, 4 floppy)	$175	$159
SCSI		
Future Domain We recomend Future Domain SCSI controllers for superior quality performance, & compatibility.		
8Bit 850MCD (Hard Drive, CD ROM)	$79	$65
16Bit 1680SVP (2 Floppy, Hard Drive, CD ROM)	$155	$139
16Bit 1680CKL (2 floppy, Hard Drive, CD ROM, Optical, Tape)	$209	$195
Adaptec		
16Bit 1522 (2 floppy, Hard Drive)	$99	$89
16Bit 1542C (2 floppy, Hard Drive)	$225	$210
16Bit 1542CKIT (2 floppy, Hard Drive, CD ROM)	$275	$259
16Bit 1542CKIT+ (2 floppy, Hard Drive, CD ROM, Optical, Tape)	$345	$339
EISA 2742TKIT (2 floppy, Hard Drive, CD ROM)	$419	$389
Bus Logic		
16Bit BL545KIT (2 floppy, Hard Drive)	$245	$235
Local Bus BL445KIT (2 floppy, Hard Drive)	$320	$305
EISA BL747KIT (2 floppy, Hard Drive)	$390	$375
Trantor		
8Bit T130	$79	$65
Printer Port T348	$189	$179

(both support Hard Drive, CD ROM,Optical, Tape)

MEGA HAUS HARD DRIVES
1110 NASA Rd 1 #306
Houston, Texas 77058
FAX 1-713-333-3024

1-800-786-1185

Sales Hours 8am - 8pm CST Monday
8am - 7pm CST Tuesday thru Friday
9am - 3pm CST Saturday

Local 713-333-1910

We sale within the United States, its territories, and Canada (sorry no international orders)

Circle 105 on reader service card.

VISA MasterCard DISCOVER COD/CERTIFIED CHECKS

NO SURCHARGE

We accept Fortune 500 & Government bids & PO's.
We check for COD and Credit Card fraud!

Prices & specifications subject to change without notice. Shipping charges not included. Returns must be in new condition and in original packaging. Defected items may not be returnable. No refunds on software or special orders (items not listed in ad.) All refunds subject to 15% restocking fee. All trademarks are registered trademarks of their respective companies. Personal checks held for clearance. We reserve the right to refuse any sale for any reason. (C) 1992 MegaHaus Inc.

We Know Tape, CD, Professional Solutions!

TAPE DRIVES

CONNER

250MB QIC-80 TAPE BACKUP
Conner QIC-80 Tape drives. Compatible with all other QIC-80 format tape drives. Gives 250MB capacity with a DC2120 tape. Toll free technical support. Includes backup software, all necessary cables, and 1 tape.

Internal
Mounts in 5 1/4" or 3 1/2" drive bay. Runs off your floppy controller. Includes third floppy drive cable and backup software.
$159 with 1 free tape
$149 with hard drive purchase

External for Printer Port
Runs off any standard parallel printer port. External connector allows you to run printer and tape drive at the same time. Perfect for backing up notebook or multiple computers. Very small size only 1 1/2" x 6" x 8 1/2"
$325 with 1 free tape

HIGH CAPACITY SCSI TAPE BACKUP
MegaHaus uses only the best components available for our SCSI tape drive kits. Your satisfaction is guaranteed. Kits feature:
- Future Domain TMC1680SVP 16bit controller
- Includes 1 tape, cables, mounting hardware, and manuals.
- Nova Back backup software (features unattended backup, mouse support, fast and easy operation)

Prices listed are with DOS / Windows backup software. Call for OS/2, Novell, UNIX, XENIX, and Macintosh prices.

Capacity Standard	Capacity Compressed	Brand	Max. Speed	Type	Model	Bare	16Bit Kit
250MB	n/a	Conner	6MB/min	DC6000	C2150S	$359	$579
525MB	n/a	Conner	14MB/min	DC6000	C2525S	$509	$719
750MB	1.5GB	Exabyte	30MB/min	MiniCart	EXB2105	$699	$999
2GB	n/a	Conner	22MB/min	DAT	C4320RT	$799	$969
2GB	n/a	Hewlett Packard	12MB/min	DAT	HP35470	$939	$1089
2.5GB	5GB	Exabyte	15MB/min	8mm	EXB8205	$1449	$1699
4GB	8GB	Hewlett Packard	42MB/min	DAT	HP35480	$1079	$1299
4GB	16GB	Hewlett Packard	130MB/min	DAT	C1533A	$1699	$1929
4GB	8GB	Conner	88MB/min	DAT	C4324RT	$1119	$1329
5GB	5GB	Exabyte	30MB/min	8mm	EXB8500	$2349	$2619
5GB	10GB	Exabyte	60MB/min	8mm	EXB8505	$2259	$2519

Compressed capacity is with maximum compression. The amount of compression depends on your application.

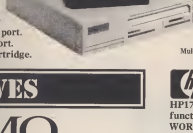
REMOVABLE DRIVES

SyQuest

High performance removable cartridge hard disk drive. Offers solutions such as unlimited capacity, data transportibility, data security, & fast backup just to name a few. 44 and 88MB drives feature 20ms, 105MB features 16.5ms. Kits include 1 cartridge.

SCSI Capacity	Model	Form	Bare	16Bit Kit
44MB	SQ555	5 1/4"	$275	$429
88MB	SQ5110	5 1/4"	$315	$499
44 or 88MB	SQ5110C	5 1/4"	$349	$519
105MB	SQ310SS	3 1/2"	$509	$689
IDE				
105MB	SQ310SA	3 1/2"	$419	$499

New! External 105MB IDE for your printer port. Attaches to any standard parallel printer port. Only 8" x 4 1/4" x 1 3/4" $579 with one cartridge.



Kalok
CORPORATION

Kalok redefines removability. How? With the wonderful, new K-Stor removable hard disk drive. An extremely high quality (we are really impressed with the quality of this product!) removable hard drive. Great for taking data from one location to the next, and endless other uses. Features 100 G's non-operating shock, IDE/AT interface, 16.5ms, & a 2 year warranty!

250MB drive	$389
360MB drive	$489
500MB drive	$789
Docking module	$89
Carrying case	$20

Multiple drive docking modules coming soon.

MEDIA

Price each at quantity	1	5
VertBatim Tapes		
DC2120	$17.5	$15.5
DC6250	$26	$24
DC6525	$31	$28
DAT 90M	$17	$15
8mm 112M	$16	$13
SyQuest Media		
44MB	$66	$61
88MB	$99	$91
105MB	$65	$61
Optical Media		
128MB	$42	$38
650MB	$109	$99
650MB WORM	$149	$145
1GB	$189	$179
1.3GB	$159	$149
1.3GB WORM	$179	$169

OPTICAL DRIVES

FUJITSU DynaMO 128

The Worlds Fastest 128MB Optical drive! Features 30ms, 3600RPM, and 256K buffer. The Worlds Smallest 128MB Optical drive! Internal will mount in 3 1/2" x 1" drive bay. External is small enough for your briefcase only 5.1" x 8.2" x 1.4".

Internal Bare	$799
Internal with Future Domain 16Bit card, Corel SCSI, and 1 disk	$999
DynaMO External with 1 disk	$959
DynaMO PC External with 16Bit controller and 1 disk	$1049
DynaMO MAC External with MacIntosh driver software and 1 disk.	$989

hp Hewlett Packard

HP1716T. 1.3GB also supports 650MB disks. Multi-function operation allows you to use rewritable or WORM (Write Once Read Many) cartridges. Features 23.5ms, 3600RPM, & 512K.

Bare Drive	$2659
Bare External	$2859
Internal 16Bit Kit	$2959

Maxoptix

Tahiti 3! 1.3GB also runs 650MB & 1GB disks. 19ms, Multifunction operation allows you to use rewritable or WORM (Write Once Read Many) cartridges. Features 4800RPM, 2.2MB/s maximum sustained read, 1.1MB/s maximum sustained write, SCSI-2 Interface.

Bare External Drive	1MB Cache $3199	4MB Cache $3349
External 16Bit Kit	1MB Cache $3479	4MB Cache $3629

Optical & Removable! Guaranteed Satisfaction!

CD ROM DRIVES

In Touch with Tomorrow

TOSHIBA

Our CD ROM drives include a Photo CD processing coupon from ADI worth $25. Kodak Photo CD Access software is only $25 with any CD drive.

XM-3401 is the fastest CD ROM drive made. It features a SCSI-2 interface, 200ms access time, 256K buffer, and 330KB/sec data transfer rate. Unparalleled speed and reliability set the 3401 CD ROM apart from the competition. Additional Features include fully integrated audio, MPC compliance and Multi-Session Kodak Photo CD support. Toshiba meets today's demanding requirements for CD ROM applications.

Bare Drive	$399
Bare Drive in external enclosure	$489
Internal 16Bit Kit	$525

TEAC

The company you have come to trust for high quality floppy drives has now introduced an incredible CD ROM drive. The CD-50 features a SCSI-2 Interface, 265ms access time, 64K Buffer, and a 335KB/sec data transfer rate. The drive is also compatible with Kodak Multi-Session Photo CD, MPC, & XA formats.

Bare Drive	$339
Bare Drive in external enclosure	$425
Internal 16Bit Kit	$459

PIONEER

CD ROM Changers allow you to have 6 disks online at one time. No more switching disks. Perfect for schools, bulletin boards etc.

DRM-600A features 600ms access time and 153KB/sec data transfer rate

Bare Drive in external enclosure	$839
External 16Bit kit	$969

DRM-604X features 300ms access time and 612KB/sec data transfer rate. The drive is also MPC , CD XA, & Kodak Photo CD Compatible.

Bare drive in external enclosure	$1199
External 16Bit kit	$1359

CD ROM ACCESSORIES

		Alone	w/ Drive
Sound Cards			
MEDIA VISION	Pro Audio Spectrum 16 with SCSI interface	$179	$159
	Pro Studio 16 with SCSI interface	$215	$199
Speakers			
SONY	SRS-88PC pair of white shielded speakers 3 watts/channel, excellent sound quality	$97	$89
	SRS-D2K shielded 3 piece system with sub woofer, 20 watt total	$159	$145
ALTEC LANSING	ACS-50 pair of white amplified speakers	$89	$75
	ACS-100 pair of white amplified speakers	$145	$130
	ACS-300 Incredible pair with subwoofer	$279	$265
Loading Devices			
	High Quality Caddies Qty 1/10	$10/9	$5/4
	Pioneer 6 Disk Magazine	$29	$20

MULTIMEDIA KITS

Mega MultiMedia Kits

MegaHaus brand kits feature SCSI interface, double speed drives. Each kit includes a Media Vision 16Bit sound card, Media Vision SCSI CD ROM software drivers, & all necessary data and audio cables. We use the full retail package of the Media Vision cards. Many of our competitors use an OEM version that is missing many of the valuable software programs.

NEW! PRO STUDIO XL ADD $120 to Studio 16 price.

TOSHIBA

XM3401, 200ms, 330KB/sec, & 256K buffer

Kit with Pro Audio 16	Internal	$599
	External	$719
Kit with Pro Studio 16	Internal	$639
	External	$759

TEAC

CD-50, 265ms, 335KB/sec, & 64K buffer

Kit with Pro Audio 16	Internal	$519
	External	$609
Kit with Pro Studio 16	Internal	$559
	External	$649

SONY

CDU-561, 295ms, 342KB/sec, & 256K buffer

Kit with Pro Audio 16	Internal	$539
	External	$629
Kit with Pro Studio 16	Internal	$579
	External	$669

(SONY Bare drive $369, with 16bit controller $499)

CD ROM SOFTWARE

Sold with the purchase of any of our CD ROM drives.

Bundle 1	San Diego Zoo's The Animals, Toolworks Reference Library, ToolworksGroliers's Multimedia Encyclopedia , Toolworks World & US Atlas Pak, & Tempra Photo CD Access		$89
Bundle 2	San Diego Zoo's The Animals, Toolworks Reference Library, World Atlas, US Atlas w/ Auto Map, Sherlock Holmes, Sports Beat, Arthur's Teacher Trouble, Chessmaster 3000, & Family ChoiceBritannica Encyclopedia		$159
Bundle 3	Toolworks Encyclopedia, Reference Library, World & US Atlas, Game Pack, Secret Weapons of the Luftwaffe		$79
Bundle 4	Toolworks Encyclopedia, World & US Atlas, Chessmaster 3000, & Mavis Beacon Teaches Typing		$79
Bundle 5	Business & Economic World Atlas, Publish It, San Diego Zoo's The Animals, US History ,& Electronic Home Library		$89
Bundle 6	Chessmaster 3000, Loom, Monkey Island, & Stellar 7		$89
Power Tools	A great shareware library		$25
Carmen San Diego	$25	Chessmaster 3000	$19
CIA World Fact Book	$22	Dinosaur Adventure	$32
Electronic Home Library	$39	Family Doctor	$66
Game Pak	$19	Toolworks/Groliier Ency.	$49
Languages of the World	$32	Library of the Future	$59
Mayo Clinic	$19	Monkey Island	$26
Phoenix CD	$19	Publish It	$28
Reference Library	$29	San Diego Zoo Animals	$33
US Atlas w/ Automap	$29	US History	$32
Atlas Pak (World & US)	$24		

CD Software not sold seperatly only with CD ROM Drives.

MEGA HAUS HARD DRIVES
1110 NASA Rd 1 #306
Houston, Texas 77058
FAX 1-713-333-3024

1-800-786-1185

Sales Hours 8am - 8pm CST Monday
8am - 7pm CST Tuesday thru Friday
9am - 3pm CST Saturday

Local 713-333-1910
We sale within the United States, its territories, and Canada (sorry no international orders)

Circle 106 on reader service card.

VISA MasterCard DISCOVER PURCHASE ORDERS

NO SURCHARGE

We accept Fortune 500 & Government bids & PO's.
We check for COD and Credit Card fraud!

Prices & specifications subject to change without notice. Shipping charges are extra. Defective items must be returned in the same condition and in original packaging. Defective items may not be returnable. No refunds on software or special orders (items not listed in ad.) All returns subject to 15% restocking fee. All trademarks are registered trademarks of their respective companies. Personal checks held for clearance. We reserve the right to refuse any sale for any reason. (c) 1993 MegaHaus Inc.

If you need any of our other 19,996 products, call.

340MB Hard Drive

Western Digital Hard Drive
12ms, 3.5", 1"H

Bare Drive Kit
$299
WD2340AB

16 Bit Kit
$319
WD2340AK

WESTERN DIGITAL

Storage at less than $1 per megabyte.

Insight VL 486DX-33MHz

- 4MB RAM-128K Cache-340MB HDD
- 32 Bit VL-Bus™ Windows Acc.,1MB
- 32 Bit VL-Bus IDE interface
- 15" NI SVGA Color Monitor
- Both 3.5" and 5.25" Floppy Drives
- MS-DOS 6.0/Win 3.1/Mouse
- 101 Key Keyboard

$1,849
NX486033TW

intel inside

CAN SHIP TODAY!

Fast local bus computer, fast delivery.

FREE Catalog

Call for your new Insight catalog, FREE! Your source for thousands of computers, hardware and software products.

A shopper's paradise.

Talon TA-2000 DS Multimedia Kit

- Talon TA-200 CD-ROM drive 240ms access time - Multispin 64K buffer, 335KB transfer rate.
- True 16 Bit Sound Board
- Stereo speaker set
- Stereo headphones
- Microphone
- Installation manual
- 8 FREE CDs

$599
CDTA2000MK

Upgrade to sight and sound.

"The options available from this direct marketer are virtually unlimited."
-PC Magazine

Insight has over 20,000 computers, hardware and software products to choose from!

Everything from software to Insight VL Local Bus Multimedia systems. From Texas Instruments, Toshiba and Compaq notebooks to brand name hard disk drives in every capacity. Monitors, tape backups, printers, CD-ROM drives, multimedia kits, memory and software.

Hundreds of experts are standing by, ready to help you select the perfect product for any task. And, you'll get it fast.

We're open 24 hours a day and back everything with our unbeatable 30-day "Worry-Free" Money Back Guarantee, 24-hour toll-free technical support, and a 1-year system warranty. Every product comes complete with everything you need.

Insight is your Super Direct™ source for computers, hardware and software.

Give us a call. We're always here.

PC MAGAZINE EDITORS' CHOICE — PC MAGAZINE EDITORS' CHOICE

Insight

20,000 Products 24 hours a day!

1912 W. 4th Street, Tempe, AZ 85281
602/902-1176 FAX 800/902-1180
Int'l 602/902-1145 FAX 602/902-1188

800-927-9921

Prices and availability subject to change without notice. PC's 30-Day Guarantee and 1-Year System Warranty may have some restrictions. Shipping is non-refundable. Opened software is not returnable. All trademarks are the properties of their respective owners. Intel Inside is a registered trademark of Intel Corporation. © Insight 1993 11/93

Circle 103 on reader service card.

What to do when Windows™ won't work.

INCREASE SPEED

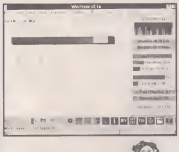
WINProbe uncovers the secrets to faster Windows operation. Simply click on the Tune Up icon and **WINProbe** analyzes your hardware and software configuration then gives you up to 35 suggestions on how to speed up your system...

- Analyzes SmartDrive settings to improve hard drive performance
- Identifies and explains how to set up a permanent swap file
- Standard or Enhanced? **WINProbe** identifies which mode is best for you
- Pinpoints the optimum driver for your VGA card
- Optimizes and frees fragmented memory
- Analyzes and suggests the best Windows setup for your system

TROUBLESHOOT YOUR OWN PC

Few things are more aggravating than computer downtime and lockups. You waste time waiting for help and usually pay a dear price to get it when you finally do. Your time is valuable, so let **WINProbe** troubleshoot the problem for you. You'll be able to quickly identify the source of the problem: hardware, software, or configuration. Telephone support time is slashed. Repair bills drop like a rock (50% and more of your repair bills are for diagnosing the problem, **WINProbe** does it for you at NO COST!). Tests include...

- CPU and system board in 16 and 32 bit operation
- Math coprocessor
- Memory; conventional, extended, expanded, and XMS
- COM ports and MODEM control lines
- Floppy drive speed and surface analysis
- Hard drive surface analysis
- Keyboard and scan codes
- Video adapter and screen
- Mouse initialization and interrupts
- Printer operation, output, and cable



RESOLVE SETUP PROBLEMS

Say 'goodbye' to software and hardware configuration and setup problems. **WINProbe** provides helpful information on...

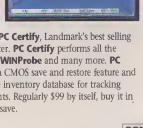
- Installing a new hard drive
- CMOS display and edit
- IRQ, DMA, and UMB usage
- What to do when installing an add-in card
- Cleaning up *.INI and *.GRP files
- Memory allocation and management
- Locating and removing duplicated system files

BUY WINPROBE OR BUY THE BUNDLE

WINProbe is available by itself or in a special bundle with **PC Certify**, Landmark's DOS troubleshooting software and **Landmark DOS for Windows**, the remarkable DOS-like operating shell for Windows.

PC CERTIFY

Sometimes it's better to troubleshoot hardware faults with the minimum amount of software loaded. Full memory and hard drive testing are not always possible from within Windows. This is why you need **PC Certify**, Landmark's best selling DOS troubleshooter. **PC Certify** performs all the hardware tests of **WINProbe** and many more. **PC Certify** includes a CMOS save and restore feature and internal hardware inventory database for tracking system components. Regularly $99 by itself, buy it in **The Bundle** and save.



LANDMARK DOS FOR WINDOWS™

Tired of slow performance using the DOS shell in Windows? Bugged by lack of free memory? Frustrated by not being able to use batch files, pipes, and redirects? If you love DOS commands, but use Windows, now you can have the best of both worlds with **Landmark DOS for Windows.** It's the only fully functioning, scalable window that looks and feels just like DOS. It runs virtually all the latest DOS commands and capabilities including DOS internal commands, redirects, pipes, and batch files. You can even run Windows applications from the command line. Resize or scroll, just like any other window, even double-click on any application displayed anywhere on the screen and it will immediately execute. **Landmark DOS for Windows** is the program and file manager you already know. Regularly $49 by itself, buy it in **The Bundle** and save.

COMPATIBILITY

WINProbe requires an IBM AT, 386, 486, PS/2 or compatible with at least 1MB of RAM, DOS 3.1 or higher, Windows 3.0 or higher, and either a Hercules mono, EGA, VGA, or SVGA video. A mouse is recommended but not required.

2 GREAT DEALS! YOUR CHOICE:

WINPROBE...

ONLY $49

WINPROBE BUNDLE...

WINProbe • PC Certify • Landmark DOS for Windows

ALL 3 PROGRAMS

ONLY $99

- **90 Day Performance Guarantee**
- **Toll-Free Technical Support**
- **NEW HOURS, EST**

Mon - Thur: 8AM - 9PM, Fri: 8AM - 6PM, Sat: 10AM - 3PM

TO ORDER, OR FOR THE DEALER NEAREST YOU, CALL

(800) 683-6696

FAX: (813) 443-6603 • Int'l (813) 443-1331

LANDMARK
RESEARCH INTERNATIONAL CORPORATION
703 Grand Central Street • Clearwater, FL 34616

EGGHEAD SOFTWARE
North America's Software Superstore

Waldensoftware

COMPUTER CITY DIRECT

elecurance boutique

Copyright © 1993 Landmark Research International Corp. All Rights Reserved WINProbe and PC Certify are trademarks of Landmark Research International Corp. Windows is a trademark of Microsoft Corp. Other names are trademarks of their associated owners.

Circle 189 on reader service card.

Serving you since 1979

JDR Microdevices®

2233 SAMARITAN DRIVE, SAN JOSE, CA 95124

BUY WITH CONFIDENCE FROM JDR!
30-DAY MONEY BACK GUARANTEE
1 YEAR WARRANTY
TOLL-FREE TECH SUPPORT

INTERFACE CARDS

Fast Multi I/O Card

- Includes two NS16550 serial ports, one parallel port and one game port
- 8-bit 286/386/486 compatible card

MCT-AIO+	$89.95
MCT-AIO	As above with one NS16450 ..... $49.95
MCT-IDEIO+	IDE w/NS16550 compatible serial $99.95
MCT-IDEIO	IDE w/NS16450 compatible serial $69.95
MCT-VIO	V L Bus IDE and Multi I/O card $99.95
MCT-IDEFH	16-bit IDE floppy card $29.95
MCT-CIDEIO	16-bit cache IDE controller with I/O $199.95
MCT-VCFH	VESA Local Bus cache IDE controller $229.95
MCT-VSCSI	VESA Local Bus SCSI-2 controller $299.95

VIDEO PRODUCTS

VGA Package with Accelerator Card

- 1024 x 768 in 16/256 colors, 800 x 600 in 16/256/64K colors, 640 x 480 in 16/256/64K/16M colors
- 14" diagonal screen; 0.28mm
- 16-bit 286/386/486 PC compatible Windows accelerator card, interlaced and non-interlaced modes

VGA-PKG-1024N	$459.95
VGA-PKG-1024	0.39mm, 1024 x 768 VGA package.. $349.95
VGA-MONITOR	0.39mm, 1024 x 768 int. monitor $269.95
VGA-MDN-1024N	0.28mm, 1024 x 768 non-int. mon.. $379.95
VGA-MDN-17N	17", 0.26mm 1280 x 1024 non-int. mon $799.00

Low Cost Windows Accelerator

- 16-bit 286/386/486 PC compatible; supports interlaced and non-interlaced, analog or multisynch monitors; VESA software compatible
- Up to 1280 x 1024 resolution in 16 colors

MCT-VGA-5000	$99.95
SPEEDSTAR-PRO	16-bit Windows accelerator $149.95
MCT-VGA-4000	16-bit 1024 x 768/256 color card $129.95
MCT-VGA-1000	16-bit 640 x 480 VGA card $49.95

DEVELOPERS TOOLS

POST Code Display Card $79.95

- 286/386/486 compatible
- Displays Power On Self-Test codes
- Works when software won't boot computer
- Includes AMI Diagnostics software

PCODE+	$79.95
PCODE	Above without AMI Diagnostics $49.95

Wire-Wrap Prototype Cards

JDR-PR2	8-bit with I/O decode layout $29.95
JDR-PR2-PK	Parts kit for JDR-PR2 decode $9.95
JDR-PR16	16-bit with I/O decode layout $34.95
JDR-PR16-PK	Parts kit for JDR-PR16 decode $12.95
PDS-601	8-bit breadboard with decode $79.95
PDS-611	16-bit breadboard with decode $89.95

EPROM Eraser $39.95

- Quickly and simultaneously erase up to 4 standard EPROMs
- Includes wall plug power supply

DATARASE II $39.95

EPROM Programmer

- Programs devices up to 512K bits, plus 27C100, 27C101, 27C301, 27C1000, 27C1001, 27C2001, 27C4001 & more
- With 8-bit 8088 & 286/386/486 PC compatible card
- ZIF socket accepts 0.6" wide DIP IC's to 32 pins

MOD-MOD-1A	$199.95
MOD-MOD-4A	As above with 4 ZIF sockets $299.95

SYSTEM BASICS

3-Button Mouse $14.95

- Accuracy 290-1450 DPI
- Dpto-mechanical design

JDR-MOUSE-3	$14.95
MOUSE-PAD	Keeps mouse ball free of dirt $4.95
MCT-GAME	Dual port game card $29.95
JSTK-300	Joystick $9.95
JSTK-500	Pilot-style joystick $19.95

MULTIMEDIA

Low Cost Internal CD-ROM Drive

- 5-1/4" half-height internal drive with 1/2 length interface card
- 150Kb-175Kb per second, 350ms average access time
- Includes drive, interface card, cables and manual

CDROM-I	$199.95
CDR-04	NEC internal dual speed CD-ROM drive $489.95
MCT-SOUND	8-bit sound card $49.95
SB-DLX	SoundBlaster 8-bit sound card $89.95
VIDEORLASTER	16-bit video card with software $329.95

STORAGE DEVICES

5-1/4" & 3-1/2" Combination Drive

TEAC

- 5-1/4" half-height beige drive
- Supports 1.44Mb, 1.2Mb, 720Kb & 360Kb diskettes

FD-5B	$149.95
FDD-2.88A	2.88Mb 3-1/2", Beige $99.95
FDD-1.44A	1.44Mb, 3-1/2", Beige $59.95
FDD-1.44X	1.44Mb, 3-1/2", Black $59.95
FDD-1.2	1.2Mb, 5-1/4", Beige $59.95
FDD-360	360Kb, 5-1/4", Black $59.95

Preformatted Bulk Diskettes in Quantities Of 250

MDD-BULK	5-1/4" 360Kb DS/DD disks w/labels & tabs	$.25 ea
MDD-BULK	5-1/4" 1.2Mb DS/HD disks w/labels & tabs	$.45 ea
3.5D-BULK	3-1/2" 720Kb DS/DD disks w/labels & tabs	$.39 ea
3.5HD-BULK	3-1/2" 1.44Mb DS/HD disks w/labels & tabs	$.59 ea

250Mb Tape Drive $179.95

- 286/386/486 PC compatible
- QIC-40 read and QIC-80 read/write compatible
- Up to 3.5Mb/minute transfer rate
- 5-1/4" internal half-height drive
- Includes DDS backup software and manual

92501	$179.95

IDE Hard Drives

PART #	BRAND	CAP.	SPEED	TYPE	PRICE
CP-3084	Conner	84Mb	19ms	3-1/2" IDE	$199.95
ST-3096A	Seagate	89Mb	16ms	3-1/2" IDE	$199.95
ST-3144A	Seagate	131Mb	16ms	3-1/2" IDE	$219.95
CP-30174	Conner	170Mb	17ms	3-1/2" IDE	$239.95
CP-30254	Conner	250Mb	14ms	3-1/2" IDE	$319.95

Seagate IDE Drive Kits

- 16-bit 286/386/486 PC compatible card
- Includes hard drive
- 16-bit controller interfaces two hard and two floppy drives

HDKIT-80	Kit with 89Mb ST-3096A drive $219.95
HDKIT-130	Kit with 131Mb ST-3144A drive $239.95
HDKIT-210	Kit with 214Mb ST-3243A drive $299.95

UPGRADE COMPONENTS

Dynamic RAM

PART #	SIZE	SPEED	TYPE	PRICE
41256-80	256K x 1	80ns	DIP	$1.95
1MB-80	1M x 1	80ns	DIP	$4.99
41256A9B-80	256K x 9	80ns	SIMM	$14.95
41256A9B-60	256K x 9	60ns	SIMM	$16.95
410000A9B-80	1M x 9	80ns	SIMM	$49.95
410000A9B-60	1M x 9	60ns	SIMM	$59.95
424000A9B-80	4M x 9	80ns	SIMM	$159.95
424000A9B-60	4M x 9	60ns	SIMM	$179.95

DUE TO CURRENT MARKET CONDITIONS, CALL FOR CURRENT DRAM PRICES

Math Co-Processors

intel

PART #	SPEED	PRICE	PART #	SPEED	PRICE
8087-2	8MHz	129.95	80387-SXP	25MHz	74.95
8087	5MHz	89.95	80387-DXP	33MHz	79.95
80287-XL 12MHz		74.95	80487-SX	25MHz	369.95

OverDrive Processors

DDP486-SX20	For 20MHz 486SX OverDrive socket $329.95
DDP486-SX25	For 25MHz 486SX OverDrive socket $449.95
DDP486R-DX25	Replace 25MHz 486DX w/50MHz DX2 $449.95
DDP486R-DX33	Replace 33MHz 486DX w/66MHz DX2 $559.00
DDP486-DX33	66MHz 486DX2 for OverDrive socket $559.00

MODEMS & FAX

14,400 Baud Internal Fax/Modem

- 14,400/12,00/9600/4800/2400 baud modem & fax
- Full Hayes command set compatibility
- QuickLink II communications software

MCT-144IF+	14,400 baud internal fax/modem $179.95
MCT-24I	2400 baud internal modem with s/w $49.95
FAXM-SWITCH	Connect fax/microphone on 1 line $89.95
FAX-SWITCH	Above without modem connection $59.95

MOTHERBOARDS

VESA Local Bus 486DX Motherboard $599

- 33MHz Intel 80486DX or 66MHz Intel 80486DX2 CPU
- Uses 256K x 9, 1M & 4M x 9 60ns SIMMs (0K installed)
- ZIF CPU socket for upgrades
- Eight 16-bit expansion slots
- MS-DOS, Windows 3.1, DESQview 386, Novell NetWare and OS/2 compatible

MCT-M486VL-33	33MHz 486DX VESA local bus	$599.00
MCT-M486VL-66	66MHz 486DX VESA local bus	$899.00
MCT-M486-50E	50MHz E/SA 486DX processor	$999.00
MCT-M386SX-33	33MHz 386SX	$129.95
MCT-C386-33	33MHz cache 386	$249.95
MCT-C386-40	40MHz cache 386	$299.95
MCT-M486SX-25	25MHz cache 486SX	$399.95
MCT-M486SX-33	33MHz cache 486SX	$449.95
MCT-M486-33	33MHz cache 486DX	$549.00
MCT-M486-50	50MHz cache 486DX	$799.00
MCT-M486-66	66MHz cache 486DX2	$849.00
LITHIUM-5V	5 volt lithium battery	$18.95

FREE JDR CATALOGS!
PC EDITION AND COMPONENTS EDITION AVAILABLE NOW!
800-538-5000

VISA MasterCard **800-538-5000** Toll-Free Tax Orders 800-538-5005 Local 408-559-1200 BBS 408-559-0253 ORDER 24 HOURS A DAY! STK CODE 1447

TERMS: For shipping & handling include $6.00 for ground & $7.50 for air. Orders over $ 25, and foreign orders may require additional shipping charges—contact our Sales Dept. for the amount. All remarks about leads are approximate and subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sales. A full copy of our terms is available upon request. Items pictured may only be representative. JDR, the JDR logo, and MicroDevices, Inc. and the MCT logo are registered trademarks of JDR Microdevices, Inc. Windows Desktop Trademark is a trademark of JDR Microdevices, Inc. Copyright 1993 JDR MICRODEVICES

Circle 153 on reader service card.

FREE Catalog Subscription 1-800-152-0386

Get warehouse savings and catalog convenience

The PC Zone™ — Your Catalog Superstore

NEW More After Dark Vol. 1

$22.95

More After Dark covers with over 1 million colors on display. *$10 rebate when you purchase After Dark and More After Dark includes systems* **W #12357**

W #07787 After Dark 2.0 for Windows $27.98
W #12555 Star Trek: The Screen Saver $34.98
W #13702 After Dark 2.0 for DOS $27.98

Aldus PageMaker 5.0

◆ **100 TrueType clip art images FREE!**

PageMaker 5.0's natural, intuitive tools and interface free you from technical distractions that reduce your creativity. Its unmatched power comes with automation and shortcuts that let you do your work faster. Aldus *W #14063*

$568.00 IN

ECCO Professional

$69.98

◆ **Introductory price expires soon!**

ECCO is a superset of traditional Personal Information Manager features, starting with outstanding Calendar, PhoneBook, and To-Do's. It then adds SuperPIM features: Dynamic Notes viewed from multiple perspectives that allow you to capture, organize and cross-reference data. Arabesque *W #13201*

DesignCAD 3D 4.0

◆ **The design software with true 3D power**

DesignCAD 3D has it all! Solid modeling, super rendering capability, volume and area calculations, 3D dimensioning and text. American Small Business Computer *B #09251*

P #09613 DesignCAD 2D 6.0 ..... $174.98

$248.98

VERSA: The Small, Powerful, Versatile Notebook

HOT! $1319

NEC UltraLite Versa 25 - Color

◆ **Power-saving Intel i486 SL chip**
◆ **Active matrix screen for presentation-quality display**
◆ **Convertible from notebook to pen tablet to desktop system**
◆ **Total modularity - upgrade components in seconds**
◆ **Local bus video for faster graphics**

Though it weighs less than 7 lbs., the first upgradable notebook is a heavyweight in computing flexibility and power! Detach the screen and use it as a pen-based computer to take meeting notes. Reattach the screen and work throughout a coast-to-coast flight with DoubleTime second battery support. Back at the office, use it for full-speed-ahead desktop computing. NEC *B #13106*

B #13104 UltraLite Versa PC4100511 ..... $2,888
B #13105 UltraLite Versa PC4100521 ..... $3,169

$6 overnight Shipping via Airborne Express

Don't see the product you're looking for? Just call...

TOP 50 HARDWARE PRODUCTS

B 09689 ACS300 Computer Speaker System w/Sub Woofer $298.98
B 12951 Advanced Gravis Analog Pro $39.98
B 09910 Bernoulli 90MB Cartridge 5.25" $94.98
B 09808 Canon BJ-10e Ink Refill BK 2 Pack $14.98
B 09735 Canon BJ-10EX Bubble Jet Printer Black $287.00
B 09823 Colorado Jumbo 250 TBV $189.98
B 11955 Fuji 3.5" HD IBM Formatted 11 Pack $11.95
B 11953 Fuji 5.25" HD IBM Formatted 11 Pack $8.95
D 15196 Fusion Double CD 16 ..... $528.98
B 12182 Hayes ACCURA 24 FAX/96 Ext $244.98
B 12116 Hercules Computer Graphite HG210 ..... $298.00
W 12629 Hercules Dynamite VL D501 ..... $174.00
B 13535 Kensington Expert Mouse 4.0 ..... $98.98
B 06421 Kensington Micro Saver System $49.98
B 04690 Kensington NoteBook Traveler Deluxe Case $78.98
B 06512 Kensington Notebook Traveler Executive $112.98
B 10662 Maxtor MXT 721SA 213.0mb IDE Int HD 15MS $279.98
D 08620 Microsoft Serial Mouse and PS/2 ..... $86.98
W 11951 Microtek ScanMaker II $878.00
W 11950 Microtek ScanMaker II XE $1,098.00
W 07860 Multisound $548.98
B 06722 NEC Multisync CDR 7+-1 ..... $636.00
B 99801 NEC Multisync 15 Monitor SFGe $629.00
B 07399 NEC Multisync 17 Monitor SFG $1,398.00
B 09990 NEC Multisync 17 Monitor SFGe $1,188.00
B 06701 NEC SilentWriter M95F $948.00
B 09521 Pantone Process Color Imaging Guide 1000 ..... $65.98
B 04956 Pantone Process Color System Guide $54.98
B 06280 PowerPoint Laser Light Pointer $98.98
D 12545 Presenter Plus Sound $558.98
B 10868 Pro Audio Spectrum 16 ..... $168.98
B 11129 Remote Power On/Off $118.00
B 07874 Seagate Int. 107MB IDE $299.98
B 08228 SIMMS 1MB/9 - 80ns $249.98
B 02192 Sony 3.5 2HD 10 Pack $13.98
B 06404 Sony 3.5 Rewrite M O 512 Byte/Sec 128 MB $48.98
B 12129 Sound Blaster 16 ASP $228.98
B 05125 SuperMatch 17 Multimode Color $999.98
B 00414 SupraFAXModem V. 32BIS w/o SW and Cable $249.00
B 02183 SyQuest 44MB Cartridge Unformated $64.98
B 00185 SyQuest 88MB Cartridge $106.98
B 06363 Targus Business Traveler - Standard Version $198.00
B 06610 Targus Leather PowerBook Case $99.98
B 06025 Targus Notepac Case Black $35.98
B 06859 Texas Instruments micro/Writer PS23 ..... $698.00
W 06499 Tumbolina/Wm PhoneNET Kit $275.00
B 12035 Trakker 250 ..... $369.00
W 10514 Ultima Home Ofc 14.4kbs data/14.4kbs FAX w/voice $294.00
B 10728 Video Blaster Bundle $348.00
W 11825 Video Spigot for Win $428.00

THE BEST OF THE REST . . .

B 09064 Advanced Gravis Joystick - Black $36.98
B 05701 Bernoulli Transportable 90 Pro Ext $678.00
B12352 Canon Bj 200 ..... $318.98
B 12181 Hayes ACCURA 24 Ext $82.98
D 11665 Hayes OPTIMA 144 + FAX144 ..... $459.00
W 12622 Hercules Graphite HG 510 ..... $329.00
W 12623 Hercules Graphite HG 720 ..... $469.00
B 07216 Logi Iafz Mouse $39.98
B 06723 NEC Multisync CDR 38 ..... $482.00
B 99800 NEC Multisync 15 sFGe $749.00
B 05521 Pantone Color Imaging Guide 1000 ..... $63.98
W 12188 Pantone ColorEdp - for Windows $64.98
B 03691 PLI CD-ROM HD $570.00
B 03539 Power Tree 10 ..... $17.98
B 03545 Power Tree 50 ..... $45.98
B 11938 PowerBacker Plus 500 ..... $278.98
B 11939 PowerBacker Plus 450 ..... $158.98
B 10511 Practical PM 14400 FXM14/14.5/R Fax Int $226.98
B 12380 Practical PM 9600 FX 96/96 S/R Fax Int $195.98
B 12351 Practical PM 2400 Pocket 24/96/48 S/R Fax Ext $124.98
B 11960 Quantum 240MB Hard Card Easy $549.00
B 12131 Scanman Color Handheld Scanner $598.00
B 04691 Shiva NetModem E Thin/BNC $1,478.00
B 12530 Sound Blaster Deluxe $98.98
B 12538 Sound Blaster Edutainment 16 Int $548.00
B 12531 Sound Blaster Pro Deluxe $128.98
B 98890 SuperMatch 20T Multimode Trinitron Cr Dsply $2,868.00
B 11986 SyDOS Puma 88 ..... $498.98
B 05284 Targus Premier Leather Notebook Case $138.98
B 07454 Targus Universal Notebook Case $68.98
B 08915 TEAC 1.4MB 3.5" Floppy Drive $59.98
W 11827 Thunder 24 Elsa $1,789.00

KEY

W = Windows D = DOS
B = Both Windows & DOS

-3" = 3.5" Disk -5" = 5.25" Disk
-D = Dual (Both 3.5" & 5.25" Included)
-C = Compact Disk

The Best Service Policies in the Industry

- All major credit cards accepted. No surcharge
- Credit card not charged until order is shipped. If we must ship a partial order, freight is not charged on back order (USA only)
- Most personal and company checks accepted. Allow 10 mail days minimum delay. Attach our purchase orders (must have a phone number and contact person name and title) to your order. Include all required checks
- C.O.D. orders accepted. First $1,000 per order. Cashier's check, or money order only. Add $5.00 per C.O.D. order
- Educational, government and corporate purchase orders accepted
- All U.S. shipments insured at no extra charge. All products covered by 120 day limited warranty
- Add applicable sales tax, only in WA, OR
- Prices and product availability subject to change without notice. All special and promotions limited to stock on hand. Call for current prices
- All shipments ship by "in stock" items, business days only, Mon-Fri
- Shipping: $5.* per order in the USA for overnight Airborne Express, up to 7 lbs., plus $1.* for each additional pound. Hawaii and Alaska customers are extra day for delivery. Canadian customer orders: In most cases delivered within 24 hours
- Call for complete information
- **Orders placed by 2pm PT weekdays ship that day.**
- **Orders placed Saturday ship by noon Monday.**
- *Shipping & handling charges are subject to change. Shipments to P.O. Boxes only APO/FPO
- Competitive and version upgrades require proof of purchase of qualifying software
- Not responsible for typographical errors
- **Defective software replaced immediately. Hardware repaired or replaced at our discretion**
- **Return Authorization Number must be obtained prior to returning any item.**
- **We reserve the right to limit quantities**

Call Customer Service Hotline: 1-800-240-9945 weekdays 6am to 5pm PT.
The PC Zone • 17421 NE Union Hill Road, Redmond, WA 98052-8718
International: 206-883-3088 FAX: 206-881-3421
International FAX: 206-883-8940

©1993 Copyright Multiple Zones International, Inc. All rights reserved.

PLEASE USE THIS CODE TO RECEIVE THESE SPECIAL PRICES: 31106

The PC Zone™
Your Catalog Superstore

Call Your Catalog SuperStore Today 1-800-252-0386

Order before 2 a.m. ET weekdays for next day delivery!

Lower than warehouse and superstore prices!

Questions?... Ask Our Knowledgeable Sales Advisors

Fire Up Your Fonts

PIONEERING Font Styling Technology

Effects SPECIALIST For Windows

Graphic Dynamite! WINDOWS

Effects Specialist for Windows 1.0

- **Exceptional font styling and design capabilities**
- **FREE Monotype fonts and Poly Type graphics!**

Harness power and creative versatility with Effects Specialist's outstanding font styling and design capabilities. With this extraordinary new program anyone, from novice to pro, can quickly and easily transform ordinary fonts and graphic shapes into spectacular special effects. This is the ideal program for creating great-looking logos, headlines, titles, mastheads, presentation slides and an endless array of imaginative and unique designs.
Postcraft International, Inc. *W #11907*
W #07252 Layouts for PageMaker $72.98

$108.98

Hercules Dynamite VL D501

- **Up to 500% faster in DOS!**

Faster memory-to-screen transfers in Windows, faster scrolling, image redraws, business applications, games — everything! Easy hardware installation, two-year limited warranty and FREE technical support. Hercules *W #12629*

$174.98

Fusion Double CD 16

- **Uses NEC multi-session mechanisms**

Fusion CD 16 combines all the power of multimedia in one convenient package. Included are a dual speed internal CD-ROM player, Pro Audiospectrum 16 sound card and high-quality speakers.
Media Vision *B #13156*

$628.98

Expert Mouse 4.0

- **Move only the ball – not the entire device!**

Expert Mouse 4.0 offers space-saving design and software customization to fit you! Enhanced button controls speed input and Brilliant Cursor technology gives pixel-by-pixel precision. Kensington *B #13533*

$98.98

Getting Started with Windows 3.1 Tutorial

- **90-minute audio cassette for step-by-step instruction**
- **Practice disk for lesson and exercise files**

Personal Training Systems *W #11769*

$29.98

We have more than 2,500 different products in stock.

TOP 50 SOFTWARE PRODUCTS

W 10923 Acif for Win 1.1 - 3" $268.98
W 11903 Adobe Photoshop 2.5 for Win - D $568.00
W 13033 Adobe Photoshop/Illustrator Bundle $619.98
W 07787 Aldus Dark 2.0 for Windows - D $27.98
W 12562 Aldus PageMaker Upgrade $139.00
W 07737 Aldus Persuasion 2.1 - 3" $318.98
B 07326 Borland C++ 3.1 - 3" $528.98
W 11560 CorelDraw 3 - 3" $154.98
D 09996 Design Your Own Home Architecture - D $32.98
W 11328 FileMaker Pro 2.0 for Windows Upgrade - D $118.98
W 07475 Fractal Painter 2.0 for Windows - 3" $258.98
W 11188 FrameMaker 4.0 - 3" $579.98
W 07431 FreeLance 2.0 Competitive Upgrade - 3" $98.98
W 08668 Lotus 1-2-3 for Windows 1.1 - 3" $320.98
W 12397 Lotus 1-2-3 4 for Windows Upgrade - 3" $98.98
W 09725 Lotus Ami Pro 3.0 Competitive Upgrade - D $94.98
W 12015 Lotus Improv for Windows - 3" $89.98
W 11195 Lotus Organizer for Windows - D $98.98
W 12102 MS Access 1.1 Competitive Upgrade - 3" $98.98
W 07497 MS Bookshelf for Windows 3½ Edition - C $128.98
D 12226 MS DOS 6.0 Upgrade - 3" $48.98
W 11978 MS Encarta - C $248.98
W 07893 MS Excel 4.0 Competitive/Version Upgr - 3" $98.98
W 11886 MS FoxPro 2.5 Windows Comp Upgrade - 3" $144.98
W 12153 MS Office 3.0 Competitive/Version Upgr - 3" $348.98
W 07209 MS PowerPoint 3.0 for Win Comp Upgr - 3" $118.98
W 12147 MS Printing System for Windows - D $128.98
W 12027 MS Profit - 3" $128.98
W 07630 MS Project 3.0 for Windows - D $448.98
W 09750 MS Publisher for Windows - D $128.98
W 11878 MS Visual Basic Pro 2.0 Comp Upgrade - 3" $198.00
W 07752 MS Windows 3.1 - 3" $88.98
W 07404 MS Word 2.0 for Windows Comp Upgr - 3" $118.98
W 09763 MS Works 2.0 for Windows - D $128.98
W 07634 Norton Desktop for Windows 2.2 - 3" $114.98
B 07582 Norton Utilities 7.0 - 3" $114.98
W 11872 Paradox for Windows $128.98
W 12221 PC Tools for Windows - 3" $139.98
W 11740 Pixar Typestyle for Windows 1.3 ..... $184.98
W 11145 Precomm Plus for Windows - D $94.98
B 07977 QEMM 386 - 3" $59.98
W 11910 QuarkXPress 3.2 for Windows - 3" $579.98
W 11257 Quattro Pro for Windows - 3" $42.98
W 09758 Quicken 3.0 for Windows - D $98.98
B 09851 Stacker 3.1 - D $98.98
W 12056 The Printshop Deluxe for Windows - 3" $48.98
W 11509 Vision for Windows - D $198.98
W 09577 WinFax Pro 3.0 - D $78.98
W 07011 WordPerfect for Windows Comp Upgrade - 3" $118.98
W 07012 WordPerfect Version Upgrade 5.2 - 3" $98.98

THE BEST OF THE REST

W 09311 ABC Flowcharter for Windows 2.0 - 5" $339.98
W 07918 Acrifile 2.0 for Windows - 3" $49.98
W 13021 Adobe Acrobat Starter Kit $668.98
W 13013 Adobe Premiere for Windows $389.98
W 11235 Adobe Type Set Value Pack - 3" $38.98
W 07849 AutoSketch for Windows - D $174.98
W 11919 Calendar Creator Plus 1.0 for Windows - 3" $39.98
W 07731 Carbon Copy 2.0 - D $118.98
D 12138 ClarisWorks - 3" $94.98
W 15000 CompuServe Membr. Kit for Windows - 3" $24.98
W 12556 CorelDraw 4 ..... $588.98
W 11063 Direct Access for Windows - D $64.98
W 11907 Effects Specialist for Windows - 3" $108.98
D 12184 EIFish - 3" $36.98
W 07458 Fastback Plus for Windows $68.98
D 11092 Images w/Impact! CD-ROM - C $248.98
W 13001 infiniType Plus - 3" $54.98
W 11335 ManagePro 2.0 for Windows - 3" $238.98
W 12859 Morph 1.0 for Windows - 3" $98.98
W 07750 MS Windows 2.1X, 3.0 to 3.1 - 3" $48.98
D 11967 myHouse - D $39.98
W 07968 New Math Blaster Plus - D $38.98
B 07153 Norton AntiVirus $84.98
W 12165 Paradox/Quattro Pro for Windows - 3" $168.98
B 12551 pcANYWHERE 1.0 for Windows - 3" $128.98
W 11078 Peachtree Acctg for Windows 2.0 - D $114.98
B 07980 Presentation Task Force - D $128.98
W 13007 Publisher's Paradise - C $29.98
W 12512 Quicken for Windows Business Pack - D $59.98
W 11849 SuperOffice Lite for Windows - D $29.98
W 10530 WordForward Pun Pack - D $28.98
D 11128 WordPerfect Works Competitive Upgrade - D $74.98

DON'T MISS IT!

Every issue of the PC Zone features:
- Over 2,400 of the latest software & hardware products for your PC
- Exciting contents and offers!

FREE PC ZONE 1 YEAR CATALOG SUBSCRIPTION 31106

The PC Zone™ Your Catalog Superstore

Name _____
Address _____ Apt _____
City _____ State _____ Zip _____

Mail to: The PC Zone, 17411 N.E. Union Hill Road, Suite 140, Redmond, WA 98052-6716 Expect your first issue in 4-6 weeks

PLEASE USE THIS CODE TO RECEIVE THESE SPECIAL PRICES: 31106

To Contact Our International Offices Call:

- **FRANCE** Voice: ..... 33 14613 4740 Fax: 33 14790 6903
- **BELGIUM** Voice: ..... 322 5203037 Fax: 322 5201616

SURPLUS SOFTWARE
INTERNATIONAL

Call to get on our mailing list!

Dashboard 2.0
$39

Dashboard provides convenient push-button controls for all your Windows™ functions. Quickly launch & monitor applications at the touch of a button. Handy fuel gauge allows you to monitor memory & hard disk usage. Group applications & documents into projects and launch tham with one mouse click!
Includas FREE Serial Mouse!

PC Tools VERSION 8 FOR DOS
$49

Over 30 advanced utilities in one integrated package! New features include an integrated program & file manager, advanced data recovery with automated disk analysis & repair, full anti-virus protection that detects over 1,300 known viruses, data backup module with automatic, scheduled operation. Optimize the operation of your PC with version 8 of this award-winning package!

MS Entertainment Pack 3
$15

An amusing array of diversions for the Windows™ equipped PC. Tee off at the Fuji Golf Tournament, ski your favorite slalom run with SkiFree, or pit your wits against your computer in the word game WordZap™. Includes more than a half-dozen entertaining games! Entertainment Pack 3 also includes a screen-saver with multipla modules. Hours of fun at a graat price!

TURBO PASCAL 1.5
$79

TURBO PASCAL for Windows™ simplifies MS-Windows 3.1 development. Design programs that take full advantage of the Windows graphical interface. With the object-oriented environment, ObjectWindows, just a few lines of code gives you a fully functioning Windows application. TURBO PASCAL for Windows has everything you need to develop powerful Windows applications

Lotus Smart Suite v1.1
$199

Five great applications working together to make you more productive. Included in SmartSuite are: **Lotus 1-2-3 v1.1**, **Freelance Graphics 1.0** presentation builder, **Ami Pro 3.0** word processor, **cc:Mail 1.0** electronic mail system & **Organizer 1.0** personal information manager. All five are full-featured, powerful epplications designed to work together.

OS/2 v2.0
$39

The rich grephical interface that works the wey people work. Runs a wide range of DOS, Windows™ and OS/2 applications all intagrated on your desktop. Object-oriented drag & drop to selact and use applications and data. Ready for the next genaration of 32-bit applications. Requires 4 MB mamory and mouse. 3.5 inch diskattas.

FREELANCE Graphics 2.0 For Windows
$69

The fastest & easiest way to create professional-looking slides, overheads & handouts in Windows™! Just select a look, choose a leyout and fill in the blanks. Automated data, text & graphic tools combine with a library of templates and paga layouts to make the task of prepering presentation graphics so easy that a CEO can do it

Carbon Copy 1.0 for WINDOWS
$39

With Carbon Copy for Windows™ you can control the programs, files end attachad peripherals of another PC running Windows™. The PCs can communicate via modem or can be connected with a null-modem cabla. Assist another remote PC user or simultaneously work on a document with a co-worker! Includes guast & host.
V 5.22 for DOS$39

PICTURE WIZARD FOR WINDOWS
$15

Dozens of fun projects and useful utilities for all ages and occasions Software tools for kids (and adults) put graphics & pictures together to create signs, posters, reports, invitations, banners and much more! Includes clip art library. Charting function and text formatting make this product a natural for creating dazzling school reports!

PFS Window Works 1.25
$19

A seven-module program to give you all the tools you need! Includes Word Processor, Spreadsheet, Databasa, Graphics, Chart Editor, Address Book & Communications modules that are fully integrated for maximum functionality. Make the most of your time with Window Works from Spinnaker Software Includas both 3 1/2" and 5 1/4" diskettes.

Media Blitz
$29

Introduce yourself to the sights and sounds of Windows™ 3.1 multimadia! Media Blitz lets you play a variaty of sound end motion files and lets you combine filas to make multimedia shows. Automatically launch multimedia shows from within other Windows™ applications using Dynamic Data Exchange (DDE). No programming required!

Express Publisher 2.0
$19

Create eye-catching heedlinas, logos & graphic elaments with TextEffects module, import graphics and text files, and assamble and print out your document at maximum resolution on dot matrix, inkjet or lasar printer. Easy to use "Windows-like" interface. Includes 8 scalable fonts & 100 high-quality graphics
Expresa Pub. for Windows 1.0 .. $49

Quicken
$19

Painlessly organize your finances! Ouicken manages multiple checking, savings & money market accounts. Track cesh, credit cards, loans and mortgages. Maintain & raport on investments & detail all tax-related activity. Ouicken can write checks on your printer or pay your bills alectronically
Quicken 5.0 (OOS) $19
Quicken 1.0 (Windows) $19

After Dark 2.0
$19

With flying toasters, swimming swans, or a tenktul of tropical fish, After Dark for Windows™ has set the standard for screen sever softwara. Varsion 2 includes over 40 displays- many with their own sound effects without additional hardware! After Dark 2.0 also includes WallZapper™ to instantly tum any After Dark display into wallpaper with a single keystroke

The Family Doctor CD-ROM
$29

Easy to understand advice to over 1,500 of the most commonly asked medical questions. Hundreds of full color medical illustrations. Complete data on over 1,600 prescription drugs. Namas & addresses of educational resources & support groups. Includes a complete full text index, indax browsing end table of contents. Multimedia retrieval software for PC & Macintosh.

American Business PHONE BOOK CD-ROM
$19

Ten million U.S. Businesses & phone numbers on one CD-ROM! This revolutionary CD-ROM lets you find a phone number for virtually any U.S. business in seconds This database is compiled from 5,000 Yellow Page telephone directories. Saarch by company name across the country or in a city, state or Zip Code!

Compton's Multimedia Encyclopedia CD-ROM
$89

The unmatched reference source for homa and school. The Windows version of Compton's Encyclopedia is a must for every home! Conteins all 26 volumes packed into one CD-ROM, with ovar 10 million words, 32,000 articles, 15,000 images, with animation, sound, music and speech. Hours of leaming and antertainment!

CD-ROM Multimedia Upgrade Kit
$289

Bring your PC into tha 90's with this multimedia upgrade kit from Mitsumi. Includes quality internal CD-ROM drive, MPC sound cerd with CD interface, and deteiled instructions that make installation a braaze. Upgrade kit also contains 3-title CD-ROM bundle. Finally, you can have affordabla access to tha ever-increasing variety of software on CD-ROM.

SOFTWARE BLOWOUT!

HyperPad 2.0	DOS/WIN	$15
C.P. Antivirus1.3	DOS/WIN	$15
Norton Antivirus 2 0	DOS/WIN	$15
Career Design	DOS	$19
Datasel Gold	DOS	$19
Desqview 1.0 386	DOS	$19
Amish Utilities	WIN	$12
Showpartnsr FX	DOS	$25
Daily Plan It!	DOS	$15
Cathy Daily Plan It!	WIN	$19
Expense It!	DOS	$12
FormWorx	WIN/DOS	$49/$25
Flintstone Fonts	WIN	$12
Dr. DOS 6.0	DOS	$19
Printmaster Plus	DOS	$12
Gofer 2.0	DOS	$9
Superstor Pro	WIN	$29
Headroom 2 0	DOS	$9
Reader Rabbit II	DOS	$12
Calandar Creator 4.0	DOS	$19
Correct Grammar 3.0	DOS	$9
Paradox 3.0	DOS	$59
CorelDraw Clip Art Asst.	DOS	$12
Instant Artist-AutoDesk	WIN	$39
16 Bit Sound Card	WIN/DQS	$89
PC Globe 4.0	DOS	$19
Corel Draw 3.0, 3 5" only (No CD)		$99
Ami Pro 3.0, 3.5" Media	WIN	$89
PackRat 4.1	WIN	$89

CURRENT VERSIONS LOWEST PRICES!

Aldus PageMakar 5.0	$529
Paradox for WIN	$119
Paradox for DOS	CALL
Generic CAD 3D 2.0	$249
Borland Office for WIN	$289
Coral Draw 4.0/4.0 UPG	$369/239
Act for WIN 2 1	$239
ProCom Plus for WIN	$89
Lotus 1-2-3, 4.0 UPG	$89
CA Cricket Paint for WIN	$59
Ami Pro UPG 3.0	$89
MS Excel/UPG	$289/115
MS Word WIN/UPG	$285/$115
MS Publisher 2.0	$99
Harvard Graphics WIN 2.0/UPG	$259/$125
Harvard Graphics DOS 3.01/UPG	$375/$89
LapLink V	$89
WordPerfect 6.0 DOS/UPG	$275/$99
WordPerfect for WIN 6.0/UPG	$275/$79
WinFax Pro	$7
CA-Compete	$49
CA-DBFast WIN	$59
Jurassic Art	$35
Windows 3 1/UPG	$49
Quicken 7.0	CALL
Ouicken for WIN	CALL
Packrat 5.0	$219
MS Printing System	$125
Fractal Painter 2.0	$255

SFX CD-ROM MPC/WIN
$29

A sound effects library on one disk! SFX is 300 digitally recorded sound effects that will giva your presentations and programs life. Sounds are recorded in 5 different formats to ensure compatibility. A user-friendly search engine lets you search for sounds by name or description. Sounds are also playable on almost any audio CD player.

Playing with Language CD-ROM MPC
$29

Kids learn a new language the fun way! Interactive multimedia games immerse childran & edults into the new language from the start. Games includa identifying colors, objects, shapes, clothing, animals & action in the new languaga
AVAILABLE IN. **JAPANESE, FRENCH, ENGLISH, GERMAN & SPANISH.**

OUR POLICIES
- **Visa & Mastercard Accepted. No Charges Until Order Is Shipped**
- **Purchase Orders Accepted Upon Credit Approval**
- **Item Availsbility & Prices Subject To Changa Without Notice**
- **Upgrade Offera & Special Promotions Are Subject To Change**
- **Compatibility Not Guaranteed**
- **Returns Must Have Return Authorization Number**
- **No Returns On Used Or Open Products**
- **All Defective Product Handled Through Manufacturer**
- **Orders Placed Before 3:00 PM Pacific Time Shipped Same Day**
- **Calt to Get On Our Mailing List!**

MasterCard VISA AIRBORNE EXPRESS

1-800-753-7877

INTERNATIONAL ORDERS: (503) 386-1375 • FAX ORDERS: (503) 386-4227

489 North 8th St.• Suite 110 • Hood River • OR • 97031

Circle 110 on reader service card.

ARNETWORKING

Here's why today's direct buyers are making Arnet their total connectivity solutions vendor:

Price/Performance

Arnet's multiuser I/O boards deliver the best price/performance value in the industry with solutions that support from two to 512 users and operate at speeds from 2400 to 115K baud - with prices starting at under $70 per port!

Superior Engineering/Support

Unequaled engineering gives our boards the lowest field failure rate in the industry - less than 1%. Reliability is built-in with features like SurgeBlock, protection from transient power surges on every line, and Intelligent Fault Bypass which reroutes data around failed ports until you can replace the board. Plus, we're compatible with more than 30 operating systems including UNIX, DOS, Multiuser DOS and NetWare.

24-Hour "Hot Swaps"

If an Arnet board ever fails, you can have a replacement at your site within 24 hours - so your users are never down because of a board failure.

30-Day Money-Back Guarantee - Plus a Lifetime Warranty

Arnet protects direct buyers two ways. We back our reliability with a Lifetime Warranty. And our 30-day, hassle-free, money-back guarantee lets you return our boards for a full refund.

No Hassle Terms

Qualified customers can use our convenient Arnet Gold credit card, or other major credit cards, for all your Arnet purchases. We even offer next day delivery.

6 pak **Buy six boards – now or one at a time - and get the next one FREE!**

Ideal for Multichannel & Multiuser PC Systems

New

Intelligent COM Ports for Your DOS/Windows System

PortsPLUS

Ideal for **DOS, Windows, OS/2** and major LAN operating systems including **Novell NetWare** and **Microsoft LAN Manager**

- Two RS-232 serial ports up to 115 Kbps
- Intelligent 80186 processor w/64K RAM
- Standard DB-9 connectors
- Easy to configure and install

only **$224**

Serial I/O Boards for Multichannel and Multiuser PC Systems

MultiPort and SmartPort Families

Standard and intelligent cards for ISA, EISA and Micro Channel support

- From 2 - 32 RS-232 ports; RS-422 option
- Full signal support for asynchronous modems and other serial devices
- Supports I/O speeds up to 38.4K baud per port
- Variety of convenient cabling options - RJ-12, DB-25 and RJ-45
- Supports all major operating systems

MultiPort Lite *Starting at* **$269**

SmartPort Lite *Starting at* **$337**

Complete UNIX-based Fax Solution

New

Create and Send a Fax Document from the Desktop

ArnetFAX

- Works with Arnet's fax board as well as most popular external fax/modems
- Easy to use menu interface
- Support for up to 8 fax lines per system

ArnetFAX *single line* hardware/software **$746**	ArnetFAX *software only* **$446**
ArnetFAX *dual line* hardware/software **$971**	

Please call for list of compatible external fax/modems.

Call for Our Complete Catalog of Multiuser Connectivity Solutions

800-800-9829

FAX 800-377-8848, anytime

Dealer Inquiries Welcome

ARNET

618 Grassmere Park Drive, Nashville, TN 37211, (615) 834-8000

Arnet and the Arnet logo are registered trademarks of Arnet Corporation. All other trademarks are property of their respective corporations.

Another New Advantage From Amdek "Direct"

Instant Holiday Rebates!

You know there are advantages in buying direct! Now through Dec. 31, 1993, experience the BIG Amdek "Direct" advantage – **Instant Holiday** Rebates up to $50 per product on the full family of Amdek display products right when you buy! No forms to fill out, no invoice copies to send in, no weeks of waiting for your rebate check. Other Amdek "Direct" advantages are great prices, a 30-day money back guarantee including original freight costs, free technical and service support, a one year warranty, no surcharge on credit card orders, special low pricing on evaluation unit orders, and special programs for corporate accounts. Amdek introduced the industry's first PC video monitor in 1978 and has been successfully providing quality PC monitor solutions for over fourteen years. Give us a call and experience all the advantages of Amdek "Direct"! The best combination of great prices, proven support and immediate availability from a company with over fourteen years of display experience!

Amdek Family of Display Products

	AM/432N	AM/732E	AM/814LC	AM/814	AM/815	AM/817
Max Resolution	640 x 480	1024 x 768	1024x768 NI	1024x768 NI	1280 x 1024	1280x1024NI
Screen Size	14" FS Mono	14" Color	14" Color	14" Color	15" FS Color	17" FS Color
Max Refresh Rate	60 Hz	60 Hz	60Hz	72Hz	72Hz	72Hz
Dot Pitch	— N/A	.28mm	.28mm	.28mm	.28mm	.26mm
*Unit 1-25 Price	$114	$289	$329	$359	$439	$849
*Price After Rebate	$109	$279	$299	$329	$399	$799
*Eval Unit Price	$94	$259	$289	$309	$389	$749

To Order Call Toll Free:
800-72-AMDEK
Call For Volume Discounts

AMDEK
VALUE THROUGH THE YEARS

*Available with products purchased from Amdek "Direct". Holiday rebates good while supplies last. We accept Visa, Mastercard, or cashier's check. Trade accounts are available with credit limits and terms. Shipping, handling, and applicable sales tax not included in the price. All prices, offers and specifications are subject to change without notice. Any return being shipped to an Amdek location will require an RMA (Return Merchandise Authorization) number. Original packaging and proof of purchase required to return any merchandise. Amdek is a registered trademark of Wyse Technology Inc. All other trademarks are the property of their respective owners and are used for identification purposes only. © 1993 Wyse Technology Inc.

Circle 193 on reader service card.

Again, Comtrade's 1st

a BENCHMARK IS WORTH A THOUSAND WORDS. AT LEAST THAT IS OUR PHILOSOPHY AT COMTRADE. NO MULTI-MILLION DOLLAR AD BUDGETS, NO FANCY PR FIRMS. JUST PERFORMANCE, QUALITY, VALUE AND SERVICE. LIKE DAVID VS GOLIATH, WE HAVE BEEN QUIETLY BUILDING THE BEST, MOST POWERFUL SYSTEMS THAT DEFEAT THE LARGE, SLOW MOVING, MASS PRODUCING GOLIATHS BY GARNISHING THE TOP SCORES IN

EISA SCSI-2 (VL-Bus)

- OverDrive Socket for **Pentium™** P24T Technology
- 128K Cache SRAM & Expandable to 256K
  - **4MB** RAM & Expandable to 128MB
- 1.44MB 3.5" Floppy Drive (Optional 1.2MB Drive $40)
- 32-Bit VL-Bus **Fast ASPI** SCSI-2 HD Controller
  - **340MB** 12ms SCSI-2 Drive with 256K Cache
- 32-Bit VL-Bus **ThunderPro** Graphics Accelerator with 1MB RAM (Up to 1280x1024 & up to 16.7 million Colors) **(Up to 32 Million Winmark 3.11)**
- 15" Flat Screen .28mm Non-interlaced Color Monitor **(Low Radiation, 36% larger edge to edge display)**
  - 2 Serial, 1 Parallel & 1 Game Ports
  - Enhanced 101-key Keyboard
  - Hi-Resolution 400 DPI Serial Mouse
- Anti-Virus MS-DOS 6.0 & Windows 3.1
- Three-Year System & Lifetime Labor Warranty

486/33 DX $1945
486/66 DX2 $2175

- High Speed CD-ROM Drive Add $200
- VL-Bus Diamond Viper Accelerator Add $220

EISA Dream Machine (VL-Bus)

- OverDrive Socket for **Pentium™** P24T Technology
- 128K Cache SRAM & Expandable to 256K
  - **8MB** RAM & Expandable to 128MB
- 1.2MB 5.25" & 1.44MB 3.5" Floppy Drives
- 32-Bit VL-Bus IDE **Smart Cache** HD Controller (17,500KB/Sec Data Transfer Rate on EISA DMA)
  - **340MB** 12ms IDE Drive with 128K Cache
- 32-Bit VL-Bus **ThunderPro** Graphics Accelerator with 1MB RAM (Up to 1280x1024 & up to 16.7 million Colors) **(Up to 32 Million Winmark 3.11)**
- 15" Flat Screen .28mm Non-interlaced Color Monitor **(Low Radiation, 36% larger edge to edge display)**
  - 2 Serial, 1 Parallel & 1 Game Ports
  - Enhanced 101-key Keyboard & Serial Mouse
  - Anti-Virus MS-DOS 6.0 & Windows 3.1
- Three-Year System & Lifetime Labor Warranty

486/33 DX $2055
486/66 DX2 $2285

- 17" Flat Screen .28mm 1280x1024 Monitor Add $420
- Upgrade to 4SMB / 545MB IDE Drive Add $120 / $320

Bus-Master SCSI-2 Server

- OverDrive Socket for **Pentium™** P24T Technology
- High Speed EISA DMA with 2 VL-Bus Slots
- 256K Super Fast Write-Back Cache SRAM
  - **8MB** RAM & Expandable to 128MB
- 1.2MB 5.25" & 1.44MB 3.5" Floppy Drives
- 32-Bit EISA SCSI-2 **Smart Cache** HD Controller (21,500KB/Sec DTR & access time down to 0.1ms)
  - **545MB** 9ms Fast SCSI-2 Drive with 256K Cache
- 32-Bit VL-Bus **Diamond SpeedStar Pro** Accelerator with 1MB RAM (Up to 1280x1024 & up to 16.7 million Colors)
- 14" Non-interlaced .28mm 1024x768 Color Monitor
  - 2 Serial, 1 Parallel & 1 Game Ports
  - Enhanced 101-key Keyboard
  - Hi-Resolution 400 DPI Serial Mouse
- Anti-Virus MS-DOS 6.0 & Windows 3.1
- Three-Year System & Lifetime Labor Warranty

486/33 DX $2455
486/66 DX2 $2685

- 17" Flat Screen Monitor or 1.370MB SCSI Drive Add $520
  - Ethernet Card (10BaseT) Add $80

Where It Counts!

VIRTUALLY EVERY PERFORMANCE CATEGORY, FROM VIRTUALLY EVERY INDUSTRY PUBLICATION. BUT DON'T TAKE OUR WORD FOR IT. ANALYZE THE REVIEWS. AND THEN LET COMTRADE CUSTOM BUILD A ROCK SOLID, LIGHTNING FAST SYSTEM FOR YOU. WITH SO MANY FIRSTS, WE PROMISE TO LEAVE YOU WITH A LASTING IMPRESSION. (JUST ASK GOLIATH!)

intel inside

VESA Local Bus Win-Station

- OverDrive Socket for **Pentium™** P24T Technology
- True **VESA Standard Local Bus** Graphics Accelerator
  - 128K Cache SRAM & Expandable to 256K
  - **4MB** RAM & Expandable to 64MB
- 1.44MB 3.5" Floppy Drive (Optional 1.2MB Drive $40)
  - VESA Local Bus IDE Hard Disk Controller
  - **340MB** 12ms IDE Drive with 128K Cache
- 32-Bit VL-Bus **ThunderPro** Graphics Accelerator with 1MB RAM (Up to 1280x1024 & up to 16.7 million Colors) **(Up to 32 Million Winmark 3.11)**
- 14" Non-Interlaced .28mm 1024x768 Color Monitor
  - 2 Serial, 1 Parallel & 1 Game Ports
  - Enhanced 101-key Keyboard
  - Hi-Resolution 400 DPI Serial Mouse
- Anti-Virus MS-DOS 6.0 & Windows 3.1
- Three-Year System & Lifetime Labor Warranty

486/33 DX $1595
486/66 DX2 $1825

- 14,400 Fax Modem with WinFax Lite Add $165
- 15" Flat Screen & **Low Radiation** Monitor Add $100

VESA Local Bus Best Buy

- OverDrive Socket for **Pentium™** P24T Technology
- 128K Cache SRAM & Expandable to 256K
  - **8MB** RAM & Expandable to 64MB
- 1.2MB 5.25" & 1.44MB 3.5" Floppy Drives
- VESA Local Bus IDE Hard Disk Controller
- **340MB** 12ms IDE Drive with 128K Cache
- 32-Bit VL-Bus **ThunderPro** Graphics Accelerator with 1MB RAM (Up to 1280x1024 & up to 16.7 million Colors) **(Up to 32 Million Winmark 3.11)**
- 15" Flat Screen .28mm Non-interlaced Color Monitor **(Low Radiation, 36% larger edge to edge display)**
  - 2 Serial, 1 Parallel & 1 Game Ports
  - Enhanced 101-key Keyboard
  - Hi-Resolution 400 DPI Serial Mouse
- Anti-Virus MS-DOS 6.0 & Windows 3.1
- Three-Year System & Lifetime Labor Warranty

486/33 DX $1895
486/66 DX2 $2125

- Replace 1.2MB Drive with CD-ROM Drive Add $170
- 17" Flat Screen .28mm 1280x1024 Monitor Add $420

Circle 158 on reader service card.

BDS Mark Overall Performance!

Source: Review-Computer Shopper, July & August 1993

WINDOWS Speed Index

Source: Review-BYTE Magazine, June 1993

Graphics Winmarks 3.11

Source: Review-Windows Sources, June 1993

We Stand Behind Our Products And Our Customers

- 30 Day Money Back Guarantee
- Three-Year System Parts Warranty*
- Lifetime Labor Warranty
- Lifetime Toll-Free Technical Support.
- 24-Hour BBS Support
- One-Year On-Site Service Option for Most Locations
- Rigorous 72 Hours of Burn-In Testing Before Shipping

1.800.969.2123

International 818.961.6688
Fax 818.369.1479
Japan 473.34.3700
Tech Support 800.899.4508
Hours: 7:00-7:00 Pacific Mon-Sat
15314 East Valley Boulevard
City of Industry, California 91746

COMTRADE

"Where Quality is Everything"

Purchase order from Fortune 1000 companies, governments and institutions subject to approval. Prices are subject to change without notice. Shipping & opened software are not refundable. 30-day money back guarantee applies to Comtrade's system only. *Three year warranty applies to Comtrade manufactured components only. 48 months warranty on monitor & hard drive. The Intel Inside Logo, Pentium, and OverDrive are trademarks of Intel Corporation.

PERIPHERALS

CD-ROM Software

Reference Products

Atlas	$15
Barron's College Guide	$18
Bible Library	$25
CD Play Launch	$15
CIA World Fact Book	$19
CIA World Tour	$25
Classic Collection	$29
Desert Storm	$18
Electronic Home Library	$19
Family Doctor	$25
Food Analyst	$25
Great Cities of the World	$24
Great Cities of the World II	$25
Guinaia	$44
Hawaii	$13
Inter. Business and Economic Atlas	$29
Languages of the World	$25
Library of the Future 1st Edition	$34
Magazine Rack	$22
Orient	$24
Encyclopedia	$39
Multimedia Encyclopedia	$39
Reference Library	$21
Sante Fe	$15
Software Du Jour	$14
Time Almanac	$17
Time Table of Science	$20
U.S. Atlas with Automap	$22
U.S. Atlas v3.2 Multimedia	$24
Voyage of Planets II	$32
World Atlas	$17
World Atlas v3.2 Multimedia	$19

Games

CD Game Pack	$15
CD Game Pack II	$16
Chessmaster 3000 Multimedia	$16
Consulting Detective	$21
Golden Immortal	$14
Jones in the Fast Lane	$15
Kings Quest	$16
Loom	$20
Mixed Up Mother Goose	$19
Monkey Island	$20
Secret Weapons of the Luftwaffe	$21
Sherlock Holmes	$24
Space Quest 4	$25
Stellar 7	$19
Wing Commander/Ultima VI	$19

Educational

Animals	$22
Interactive Storytime Vol. 1	$16
Mavis Beacon Teaches Typing	$19
U.S. History	$29

Applications & Utilities

Publish IT 2.0 with Clip Art & Fonts	$19
Q & A	$39
Soundworks	$21

CD-Software

Bundle Packs

Multimedia Encyclopedia Reference Library US Atlas World Atlas Game Pack II **PACK 1 $79**	Multimedia Encyclopedia US Atlas World Atlas Mavis Beacon Typing Chessmaster 3000 **PACK 2 $79**	US History Business & Economic Atlas Electronic Home Library Publish It Animals **PACK 3 $89**
Time Table of Science Science & Innovation Voyage of Planets 1 Desert Storm The Orient **PACK 4 $89**	Chessmaster 3000 Loom Monkey Island Stellar 7 **PACK 1 $79**	Family Doctor Classic Collection (Four Disks in One) **PACK 1 $89**

SOUND BOARDS

CREATIVE Sound Blaster Pro deluxe	CALL
CREATIVE Sound Blaster 16, 16-Bit Sound Card	CALL
CREATIVE Sound Blaster 16 ASP, 16-Bit Professional Card	CALL
MEDIA VISION Pro Audio Studio 16	$199
MEDIA VISION Pro Audio Spectrum 16-Bit Sound Card	$139
ADLIB Compatible Game Sound Card (great for game software)	$35
WEARNES Beethoven Audio Card upgradeable 16-Bit Sound Card	$99
TURTLE BEACH Professional Sound Card 16-Bit	$499

SPEAKERS

Technikyne shielded Speakers with volume control and built in amplifier	$25
Altec Lansing ACS 90 Amplified Speakers	$74
Altec Lansing ACS100 Amplified Speakers	$139
Altec Lansing Multimedia Speaker System with Sub Woofer (ACS300)	$276

CD-UPGRADE KITS

TEXEL Upgrade Kit Texel 3028 Super Fast CD ROM with Media Vision Pro Audio Spectrum 16-Bit Sound Card The Texel drive plugs directly into the Sound Card to give you a single slot solution. All cables are included along with all directions for easy installation.

- ✔ Internal Texel CD ROM 240ms, 339KB/sec transfer
- ✔ Media Vision Pro Audio Spectrum 16-Bit Sound Card

NOW ONLY $525

TC Pro-Upgrade Kit- Top of the line CD ROM with the ever so popular Pro Audio Spectrum bundled with some very popular software to make this the best multimedia kit you can buy.

- ✔ Dual Speed CD ROM 300KB/sec
- ✔ Media Vision Pro Audio Spectrum 16-Bit Sound Card
- ✔ Chessmaster 3000 MPC
- ✔ Wing Commander MPC
- ✔ Technikyne Amplified Speaker

NOW ONLY $369

TEXEL or TOSHIBA Upgrade Kit with Media Vision Pro Audio STUDIO 16 ***$575***

CD-ROM DRIVES

CHINON- CDSS35 Dual Speed SCSI 300KB/sec 280ms w/256K Cache	$439
PHILIPS- 206 Dual Speed 300KB/sec w/Philips Interface	$239
PANASONIC-Dual Speed 300KB/sec w/Panasonic Interface	$239
TOSHIBA- 3401B Internal Dual Speed CD Rom Drives 200ms, 256K Buffer, 330KB/sec Data Transfer 1.0MB/sec Burst Rate Kodak Multi-Session Photo CDXA & MPC Compatible	$395
TEXEL- 240ms access time, 64K Buffer, 339KB/sec Data Transfer Rate	$439
TEXEL- Internal Bare Drive Without Controller	$389
TEXEL- Internal Drive With 8-Bit Controller	$439
TEXEL- External Bare Drive, No Controller	$489

PHILIPS & MITSUMI CD ROMs

Fast Data Access-375ms & 350ms
32K Memory Buffer
Sustained Throughput of 150KB or Better
Complies with MPC CD-ROM Specs.
Includes Interface & Cables
Photo CD Ready

PHILIPS $175

MITSUMI $175

MONITORS

ViewSonic

V5	14" 1024x768 Non Interlaced .28	$319
V5E	14" 1024x768 Non Interlaced .28 72Hz	$376
V5+	14" 1024x768 NI .25 72Hz Trinitron	$469
V6FS	15" 1024x768 Non Interlaced .28	$469
V7	17" 1280x 1024 Non Interlaced .28 Digital	$879

The New Viewsonic Line of Monitors

Viewsonic 15 1280x1024 76Hx Refresh rate @ 1024x768	$459
Viewsonic 17 1280x1024 76Hz Refresh rate @ 1280x1024	$1079
Viewsonic 20 1600x1280 21 user-programmable modes	$1729

MAG INNOVISION

LX1564	15" 1280x1024 Non Interlaced .28	CALL
MX15F	15" 1280x1024 NI Digital	CALL
MX17F	17" 1280x1024 NI Digital	CALL

Other Monitors

14" .39mm SVGA 1024x768 Interlaced 50-70Hz Vertical	$199
14" .28mm SVGA 1024x768 Interlaced 50-70Hz Vertical	$220
14" .28mm SVGA 1024x768 Non Interlaced 50-90Hz Vert.	$259
15" .28mm SVGA Flat 1280x1024 NI 47-104Hz Vertical	$379
17" CTX Monitors 17" 1280x1024 NI	$729

CALL FOR ALL OTHER CTX MODELS

TC EXPRESS

1-800-759-1654

Monday-Friday 8am-8pm
Saturday 10am-4pm CST

HARD DRIVES

210 MB			
Seagate	106MB	15ms IDE Cache (ST3120A)	$155
213MB			
Seagate	130MB	15ms IDE Cache (ST3144A)	$165
Maxtor	130MB	15ms IDE Cache (MX7120A)	$159
240MB			
Maxtor	213MB	15ms IDE Cache (MX7213A)	$199
Maxtor	213MB	15ms SCSI Cache (MX7213S)	$229
Western Digital	212MB	12ms Cache IDE (WD2200)	$199
Seagate	214MB	13ms Cache IDE (ST3243A)	$195
250MB			
Maxtor	245MB	12ms Cache ID (MX7245A)	$219
Western Digital	250MB	12ms Cache IDE (WD2250)	$219
320MB-420MB			
Maxtor	340MB	12ms IDE Cache (MX7345A)	$295
Maxtor	340MB	12ms SCSI Cache (MX7345S)	$335
Western Digital	340MB	12ms IDE Cache (WD2340A)	$295
Western Digital	420MB	12ms IDE Cache (WD2420A)	$409
Fujitsu	420MB	12ms Cache IDE (F3522T)	$379
500MB-900MB			
Conner	545MB	10ms Cache IDE (CP30544)	$609
Conner	545MB	10ms Cache SCSI (CP30540)	$619
Toshiba	870MB	Cache SCSI (MK438FB)	$699
1000MB and Higher			
Toshiba	1064MB	SCSI II 512K Buffer (MK537FB)	$879
Toshiba	1200MB	SCSI II 512K Buffer (MK538FB)	$879
Conner	1300MB	SCSI II w/Cache (CP31370)	$1059

1500MB & Larger- Please Call For Current Price

250 MB IDE Hard Drive Your Choice:
Maxtor MX7245A (245MB) or WESTERN DIGITAL WD2250A (250MB)
ONLY $219

350 MB IDE Hard Drive Your Choice:
Maxtor MX7345A or WESTERN DIGITAL WD2340A
ONLY $295

TOSHIBA Hard Drives

AS LOW AS 72 CENTS PER MEGABYTE!!!

177MB	SCSI 2	12ms	(MK436FB) $699
108MB	SCSI 2	12ms	(MK537FB) $769
200MB	SCSI 2	12ms	(MK538FB) $869

VIDEO CARDS

ISA Video Cards

Diamond SpeedStar Pro ISA	$99
Diamond Stealth 24 ISA w/1MB Dram and S3 Chipset	$135
Diamond Stealth Pro ISA w/1MB Ram and S3 Chipset	$225
Diamond Stealth Pro ISA w/2MB Ram and S3 Chipset	$235
STB Powergraph ISA w/1MB & S3 Chipset 44 Winmarks	$129
16-Bit 1MB Windows Accelerator 16.7	$69
16-Bit 1MB Trident Chipset	$55
16-Bit 256KVGA Card	$30
VESA Local Bus Cards	
STB Powergraph VLB 1MB *(RUNS 52 Million Winmarks)*	$129
Diamond SpeedStar Pro VLB w/1MB Dram and Cirrus Chipset	$99
Diamond Stealth 24VLB w/1MB Dram and S3 Chipset	$135
Diamond Stealth Pro VLB w/1MB Ram and S3 Chipset	$225
Diamond Stealth Pro VLB w/2MB Ram and S3 Chipset	$299
Diamond Viper 2MB Vram and Weitek Chipset	$389
STB Pegasus 4MB VL Board 1800x1280	CALL

VISA · DISCOVER · AMERICAN EXPRESS · MasterCard

MOTHERBOARDS

486 VESA LOCAL BUS MOTHERBOARDS

486SX-25	Intel CPU 8 Slots w/2 Vesa Slots 128K Cache	$199
486SX-33	Intel CPU 8 Slots w/2 Vesa Slots 128K Cache	$285
486DX-33	Intel CPU 8 Slots w/2 Vesa Slots 128K Cache	$425
486DX2-50	Intel CPU 8 Slots w/2 Vesa Slots 256K Cache	$515
486DX2-66	Intel CPU 8 Slots w/2 Vesa Slots 256K Cache	$679

VESA Motherboard & Video Card Bundles

486SX-25 w/Diamond Speedstar Pro VLB Video Card	486-SX-33 w/STB Powergraph VLB Video Card	486DX-33 w/STB Powergraph VLB Video Card	486DX-33 w/Diamond Stealth Pro VLB 2MB Video Card
$295	$409	$549	$715
486DX-33 w/Diamond Viper 2MB VLB Video Card	486DX2-50 w/STB Powergraph VLB Video Card	486DX2-66 Diamond Stealth Pro VLB 2MB Video Card	486DX2-66 Diamond Viper 2MB VLB Video Card
$509	$639	$989	$1059

386 ISA MOTHERBOARDS

386SX-40MHz AMD CPU 6 Slots	$75
386DX-40MHz AMD CPU 64K Cache	$115
386DX-40MHz AMD CPU 8 Slots 128K Cache Upgradeable to 486	$155

486 ISA MOTHERBOARDS

486SX-25MHz Intel CPU 8 Slots 128K Cache Upgradeable to any Intel 486	$189
486SX-33MHz Intel CPU 8 Slots 128K Cache Upgradeable to any Intel 486	$275
486DX-33MHz Intel CPU 8 Slots 128K Cache Upgradeable to any Intel 486	$415
486DX2-50MHz Intel CPU 8 Slots 256K Cache Upgradeable to any Intel 486	$539
486DX4-50MHz Intel CPU 8 Slots 256K Cache Upgradeable to 486DX2-66	$599
486DX2-66MHz Intel CPU 8 Slots 256K Cache Will accept all Intel 486 CPU's	$679

486 EISA/VESA MOTHERBOARDS

486DX-33MHz Intel CPU EISA & VESA SLOTS 256K Cache	$599
486DX2-50MHz Intel CPU EISA & VESA SLOTS 256K Cache	$729
486DX-50MHz Intel CPU EISA & VESA SLOTS 256K Cache	$779
486DX2-66MHz Intel CPU EISA & VESA SLOTS 256K Cache	$859

OPTEON

CPU Fan Only $15
With Motherboard Purchase or $19.95 Alone
Great for all 486's Includes Heatsink

CONTROLLER CARDS

Caching Controllers (ISA)

Promise-IDE Hard/Floppy w/0K expandable to 16MB (DC2000)	$89
Promise-IDE Hard/Floppy w/0K expandable to 16MB w/Mirroring (DC2040)	$219

Caching Controllers (VESA Local Bus)

Promise-IDE VESA Local Bus Hard/Floppy w/0K exp. to 16MB (DC4030)	$129
Promise-IDE VESA Local Bus Hard/Floppy w/512K w/O (DC4020)	$139

Caching Controllers (EISA)

DTC-SCSI Hard/Floppy w/512K expandable to 16MB (3290)	$469

Non-Caching Controlling

16-Bit 0Ft Hard/Floppy Cont. w/1Par, 2Ser, 1 Game Pt. IDE (DFI0EIO)	$29
16-Bit Generic Hard/Floppy Cont. w/1Par, 2 Ser, 1 Game Pt. IDE (0E6IO)	$18
DTC SCSI Hard/Floppy Controller no I/O ports (3280)	$115
VESA Local Bus IDE Hard/Floppy Controller w/1 Par, 2 Ser, 1 Game Pt. (VLIDE)	$35
VESA Local Bus IDE Hard/Floppy Controller w/IO & FAST UART (VLIDE550)	$59
Bus Logic SCSI ISA Bus Master	$179
Bus Logic SCSI EISA Bus Master (BT742A)	$255
Bus Logic SCSI VESA Local Bus Master (BT445)	$255
Ultrastor SCSI 34F VESA Local Bus Master (34F)	$299
Ultrastor SCSI 24F EISA Bus Master (24F)	$425
Ultrastor SCSI 14FB ISA Bus Master (14FB)	$219
DTC VESA Local Bus SCSI Controller Card 32-Bit Hard/Floppy (3270)	$125
16-Bit 0Ft Hard/Floppy Cont. w/FAST UART & 1Par, 2Ser, 1 Game Pt. (DFI550)	$59

RAM & FLOPPY Drives

Floppy Drives		Ram Chips	
Chinon 1.2	$49	1Meg x 3 Simm Modules 70ns	Call
Chinon 1.44	$47	1Meg x 3 Simm Modules 60ns	Call
Chinon 2.88	$69	4Meg x 9 Simm Modules 70ns	Call
TEAC	$55	4Meg x 9 Simm Modules 60ns	Call
2.88MB Cont.	$35	256 x 3 Simm Modules 70ns	Call

All in One Floppy drive by Canon
ALL IN ONE 1.2 & 1.44 FLOPPY DRIVE *ONLY $99*

Magneto Optical Drives

FUJITSU Magneto Optical Drive

Kit Includes:
'M2511A Internal Drive
'4 FREE 128MB Magneto Optical Disk Cartridges
'Controller
'Cabling
'Installation Guide
'All Software Needed

- 1MB per/sec transfer rate
- O-ROM Capability
- ISO format
- Fixed Optics
- SCSI II Technology
- Fully rewritable 128MB Optical Disks
- CD, ROM/rewritable
- 3.5" Diskette Low Profile
- 3600 RPM
- 30ms Seek Time

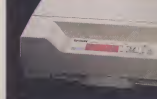
$989

MODEMS

TAPE BACKUPS

Modems		Backups	
2400 Baud Internal	$29	CDLDRADO Memory Systems, Inc.	
9624 Fax Modem Internal	$49	DJ-10 Jumbo Internal 120MB	$144
Twincom 14400 Internal	$179	DJ-20 Jumbo Internal 250MB	$164
Supra 14400 Internal	$145	JT10 Trakker External 120MB	$275
Supra 14400 External	$169	JT20 Trakker External 250MB	$325
		PT25 Powertape 2 Gigabyte Int.	Call
		PT50 Powertape 4 Gigabyte Int.	Call

LASER PRINTERS



ACTION LASER 1000 LASER PRINTER 300x 300 dpi Only $599

ACTION LASER 1500 LASER PRINTER 300x 300 dpi Only $639

EPL8000 10PPM LASER PRINTER 300x 300 dpi Only $799

STYLUS 800 INK JET PRINTER Only $319

1-800-759-1654
Monday-Friday 8am-8pm
Saturday 10am-4pm CST

TC EXPRESS

Policy: Send Checks/Money orders to P.O. Box 1321, Kenner, LA 70062 Prices/availability is subject to change without notice. Defective products will be repaired, replaced, at TC's discretion or you will be told to contact the manufacturer for service. We are not responsible for errors in typography or photography. Shipping and handling costs are not refunded. All returns must be sent back freight prepaid, and in like new condition. TC has the right to charge a restocking fee if the product is returned incomplete, damaged, missing parts etc. There are no returns for credit after 30 days. All series like Monitors and Printers are handled through their authorized service centers. Software is not returnable. All registered and un-registered trademarks are the sole property of the manufacturer

The Straight Talk People℠ ABERDEEN

As reviewed in Dec 7, 1993

AutoCAD and 3D Studio users: 1MB Cache, up to 256MB memory, 60M Winmarks

As reviewed in Dec 7, 1993

486 Mini EISA VLB

▼486 Mini EISA VLB Made in USA Motherboard (see below)
▼Intel 486 processor
▼256KB 20ns Fast Cache Memory
▼16 MB 70ns Fast Memory
▼Teac 1.2 + 1.44 MB Dual Floppy Drive
▼VLB 32-bit Caching IDE Controller with 2MB of Cache Memory
▼Seagate 341MB 12 ms HD, 256KC
▼Diamond Viper VLB 2MB video
▼ADI 3G 14" 1024 NI Monitor
▼230W UL 5-Bay Super Mid Tower Case
▼2 Serial, 1 Parallel, 1 Game ports
▼Maxi Switch 101 Enhanced Keyboard
▼MS-DOS 6 and Enhanced Tools, Windows 3.1, high-resolution serial mouse and free software bundle

486 Mini EISA VLB 256KC 16MB 341HD System					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
$2,769	$2,839	$2,979	$3,099	$Call	$3,199

486 Super EISA VLB

▼486 Super EISA VLB Made in USA Motherboard (see below)
▼Intel 486 processor
▼1 MB 20ns Fast Cache Memory
▼32 MB 70ns Fast Memory
▼Teac 1.2 + 1.44 MB Dual Floppy Drive
▼DTC 3290 32-bit EISA Caching SCSI Controller with 4MB of Cache Memory
▼Conner 1.37GB 10ms SCSI-2 HD
▼Diamond Viper VLB 2MB video
▼ADI 4G 15" 1280 NI Monitor
▼300W UL 7-Bay Super Tower Case
▼2 High-Speed Serial, 1 Bi-directional Parallel, 1 Game, Maxi Switch 101 kbd
▼MS-DOS 6 and Enhanced Tools, Windows 3.1, high-resolution serial mouse and free software bundle

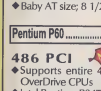
486 Super EISA VLB 1MC 32MB 1.4GHD System					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
$5,279	$5,349	$5,499	$5,619	$Call	$5,729

IBM® 486 SLC2-66 VLB

▼486SLC2-66 VLB Made in USA Motherboard (see below)
◆IBM 486 SLC2 "Blue Lightning™" 66MHz CPU with 16KB internal cache
◆Meets EPA's Energy Star "Green PC" Specs
▼64KB Fast Secondary Cache Memory
▼4 MB 70ns Fast Memory
▼Teac 1.2 and 1.44 MB Floppy Drives
▼VLB 32-bit IDE controller
▼WesternDigital 170MB 13ms HD 64KC
▼VLB 32-bit Cirrus Logic 1MB video card
▼Tatung 14UAE 14" 1024 NI LR Monitor
▼5-Bay Mini Tower Case
▼230 Watt UL Power Supply
▼2 Serial, 1 Parallel, 1 Game ports
▼Maxi Switch 101 Enhanced Keyboard
▼MS-DOS 6 and Enhanced Tools, Windows 3.1, high-resolution serial mouse and free software bundle

IBM® SLC2-66 VLB 64KC 4MB 170MB	$1,599
387 Math Coprocessor Option	$49

Made in USA Motherboards



All motherboards include the CPU at the rated speed and no memory. XXMB indicates maximum available memory. All motherboard part numbers start with M8. Motherboards and purchased memory will be pre-installed and tested. Call for best pricing.

Pentium P60 NEW

◆Intel Pentium P60 processor, 60MHz
◆True 64-bit design
◆Three 32-bit PCI, six16-bit ISA AT slots
◆256KB fast secondary cache memory
◆AMI BIOS, Made in USA
◆Baby AT size; 8 1/2" x 13"

Pentium P60	$Call

486 PCI NEW

◆Supports entire 486 CPU range and Intel OverDrive CPUs
◆Intel Pentium P24T ready with ZIF socket
◆Three 32-bit PCI, six16-bit ISA AT slots
◆256KB fast secondary cache memory
◆Up to 128MB on-board SIMM memory
◆AMI BIOS, Made in USA
◆Selectable bus clock speeds
◆Baby AT size; 8 1/2" x 13"

486 PCI 256KC Motherboard					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
4310S25	4310X33	4310D33	4310D50	4310D50	4310266
$449	$529	$679	$799	$839	$909

486 VLB Green NEW

◆Supports entire 486 CPU range and Intel OverDrive CPUs
◆Meets EPA's Energy Star "Green PC" Specs
◆Intel Pentium P24T ready with ZIF socket
◆Three 32-bit VLB, five 16-bit ISA AT slots
◆Up to 128MB on-board SIMM memory
◆64KB fast secondary cache memory, expandable to 256KB cache on-board
◆AMI BIOS, Flash BIOS Option
◆Baby AT size; 8 1/2" x 13", Made in USA

486 VLB Green 64KC Motherboard					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
4320S25	4320X33	4320D33	4320D50	4320D50	4320266
$289	$379	$509	$629	$669	$779

486 Mini EISA VLB

◆Supports entire 486 CPU range and Intel OverDrive CPUs
◆Intel Pentium P24T ready with ZIF socket
◆2 VLB, three 32-bit EISA, five 16-bit ISA slots
◆256KB burst mode 20-ns secondary cache memory, up to 1MB cache on-board
◆Up to 128MB on-board SIMM memory
◆AMI BIOS, Made in USA
◆Baby AT size; 8 1/2" x 13"

486 Mini EISA VLB 256KC Motherboard					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
4990ZS25	4990ZX33	4990ZD33	4990ZD50	4990ZD50	4990Z266
$339	$419	$559	$689	$729	$809

486 Super EISA VLB

◆Supports entire 486 CPU range and Intel OverDrive CPUs
◆Intel Pentium P24T ready with ZIF socket
◆One VLB, eight 32-bit EISA (six master) slots
◆256KB burst mode 20-ns secondary cache memory, up to 1MB cache on-board
◆Up to 256MB on-board SIMM memory with 16 SIMM sockets
◆AMI BIOS, Dallas RTC, Baby AT size
◆Made in USA

486 Super EISA VLB 256KC Motherboard					
SX-25	SX-33	DX-33	DX2-50	DX-50	DX2-66
4970ZS25	4970ZX33	4970ZD33	4970ZD50	4970ZD50	4970Z266
$489	$569	$719	$839	$879	$959

IBM® SLC2-66 VLB Green NEW

◆IBM 486 SLC2 "Blue Lightning™" 66MHz CPU with 16KB internal cache
◆EPA's Energy Star "Green PC" Option
◆Made in USA by IBM® Charlotte, NC
◆Two 32-bit VLB, seven 16-bit ISA, one 8-bit AT slots
◆Up to 16MB on-board SIMM memory
◆64KB fast secondary cache memory, expandable to 128KB cache on-board
◆AMI BIOS, Mini AT size; 8.66" x 9.8"

IBM® SLC2-66 VLB 4610	$449
IBM® SLC2-66 VLB Green 4611	$469
Green with 387 Math Coprocessor 4612	$519

800-552-6868

ABERDEEN, Inc.
7801 E Telegraph Rd Unit D, Montebello CA 90640
Phone 213-725-3368 Fax 213-725-3366

VISA MasterCard FEDERAL EXPRESS PC Computing LeaseCorp

✓Many Components Available
✓No Credit Card Surcharges
✓One Year Parts Warranty
✓Lifetime Labor Warranty
✓Free Technical Support
✓Custom Configurations

Call ENVISIONS

for and .

Talk to scanner experts,

get lifetime tech support,

hot & great prices!

We offer a variety of scanner software!

ENVISIONS is the leading direct-marketer for scanners!

ENVISIONS has over 45,000 customers worldwide, including Air France, AT&T, Coca-Cola, GTE, Walt Disney, NBC, Raytheon, Lockheed, IBM, Proctor & Gamble, General Motors, UPS, USA Today, and Yale University.

ENVISIONS offers technical expertise, specialized products, and aftermarket support so your scanner selection is made easy and affordable.

Repeat customers are important to us. We care about your satisfaction. Use our 30-day money back guarantee if you are not completely thrilled with your scanning experience! (Restocking fees may apply)

We provide each customer...

- High quality, affordable scanning solutions. ENVISIONS scanners feature award-winning optical components to ensure long lasting quality and durability. Plus, we add value to your scanner by bundling the leading software applications. No other scanner company can come close to meeting our low prices on value-added bundles!
- Knowledgeable, trained scanner consultants who are eager to answer your questions and help you decide which product bundle will best serve your needs.
- Unlimited lifetime technical support by ENVISIONS' trained scanner specialists. We can guide your installation and keep you productive!

Our reputation is outstanding!

Find out why Computer Shopper reviews say, "If you think there might be a scanner in your future, give ENVISIONS a call." —December 1992

Consumers Digest Best Buy Optics

With the perfect mix of service and support, ENVISIONS has earned an outstanding reputation in the direct channel.

★★★★
Direct Top 40 Vendors Four Star Winner
PC Computing

PC Solutions 500

So, why wait? Experience the many ways in which scanners from ENVISIONS can make your life easier! For a free consultation regarding your scanner needs or to place an order, just call ENVISIONS' toll-free scanner hotline today!

1-800-926-SCAN
(7226)

& Easy

...with ENVISIONS' support!

FROM $799

Shown Top: Optional 25-page automatic document feeder
ENV6100/24Pro ESTF6100 or ENV8100 ESTF6101
Shown Bottom: Optional slide, x-ray and transparency attachment
ENV6100/24Pro ESTG6008 or ENV8100 ESTG6018

Complete Scanning Solutions Including Top Software!

Computer Shopper readers voted us the best—now the best costs less! And, you get more bang for your buck with our powerful scanner/software bundles at these reduced prices! ENVISIONS' award-winning scanners have teamed up with **Xerox** and **Adobe** to bring you a choice of three complete text and image scanning solutions!

For text scanning: **Xerox Imaging Systems** delivers its 20 years of mainframe OCR technology to the desktop scanning market with an *extended version* of **TextBridge.** This pumped-up OCR package is ONLY available from ENVISIONS!

For image scanning: Imagine what you can create with **Adobe's Photoshop 2.5** for Windows! The acclaimed **Photoshop** has revolutionized the world of image enhancement with feature-rich editing tools. This famous image editor is yours free in LE or full versions with ENVISIONS flatbed scanners!

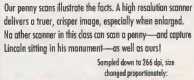
Choose 600, 800, or 1200 dpi

- 600, 800, or 1200 dpi base resolutions
- 16.8 million colors for true-to-life images
- 256 grayscales deliver rich-toned scans
- 8.5" x 14" scan window takes legal size documents
- 51 steps of brightness, contrast, threshold
- Self-aligning optics produce high resolvability and reads fine line art details
- Single light source ensures exact color registration
- On-board input/output buffer quickens scan time
- 30 day money back guarantee and 1 year warranty
- Optional transparency attachment or document feeder

In speed and accuracy tests against 6 top brands, *"(ENV6100) read and processed each page with zero errors."* —PC Sources 4/92 (The ENV6100 contains the same scanner engine as the UMAX630, used in this test)

Our penny scans illustrate the facts. A high resolution scanner delivers a truer, crisper image, especially when enlarged. No other scanner in this class can scan a penny—and capture Lincoln sitting in his monument—as well as ours!

Scanned down to 266 dpi, size changed proportionately:



Scanned at 600 dpi

Scanned at 800 dpi

Scanned at 1200 dpi

Scanner	Base Resolution/ Max. Resolution	Part #	Price Was	New Price	Bundled Software
ENV6100	600 dpi/1200 dpi	EST3022B	$999	$799	TextBridge & Photoshop LE
ENV8100	800 dpi/1600 dpi	EST3023B	$1249	$999	TextBridge & Photoshop LE
ENV24Pro	1200 dpi/2400 dpi	EST3029B	$1999	$1799	TextBridge & Photoshop Full

With TextBridge on the ENV6100, you can scan and recognize text this size (8 points) with near 100% accuracy!

With TextBridge on the ENV8100 and 24Pro, you can scan and recognize text this size (6 points) with near 100% accuracy.

ENVISIONS flatbed scanners and bundled software require 386 or higher, Windows 3.1, 4MB RAM, 8MB hard disk space free, ISA slot available for interface card. PS/2 MCA and Apple® Macintosh® versions are also available.

Questions? We love questions!™ Call our scanner hotline:

(800) 926-SCAN (7226)

Local (415) 692-9061 • Fax (415) 692-9064

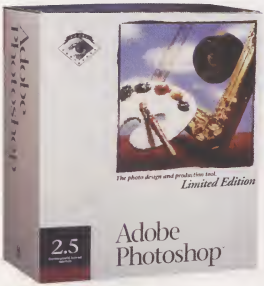
Envisions Solutions Technology, Inc., 822 Mahler Road, Burlingame, CA 94010

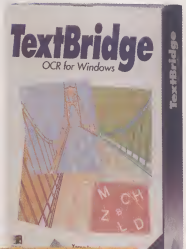
ENVISIONS

Scanner Solutions Made Easy

Free...

ADOBE™ & Xerox software!*





TextBridge is *"a powerful credit to Xerox" with "raw processing power equal to the high-end packages."*—PC Week 6/21/93

Xerox Imaging Systems
A Xerox Company

Image Editing Power Tools

Adobe Photoshop LE 2.5 image editing software offers an easy-to-use working environment for production artwork. **Photoshop LE** lets you create your own original art, edit scanned images, and import renderings from other applications. A variety of built-in painting, editing, and color correction tools ensures that you get professional-quality results. **Photoshop LE** supports EPS, TIFF, PCX, JPEG, BMP, TARGA, PICT, and Photoshop file formats for easy import/export of image files.

- Work in bitmap, grayscale, indexed color or RGB color modes
- Approximately 24 filters for applying special effects to images: Blur, Gaussian Blur, Mosaic, Sharpen, Find Edges, and many more! Many filters have unique controls to achieve more impact.
- Full tool palette: Text tool lets you lay words over an image, crop selections, rubber stamp unwanted flaws
- New Variations feature lets you adjust color by viewing a choice of thumbnail samples (shown, right)
- Quick Mask mode lets you view a mask and the image simultaneously while editing
- Dodge and Burn tool lets you lighten or darken specific areas of an image
- Resize and resample images, flip, skew and rotate to achieve desired effects

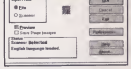
Variations feature color-corrects for you!

Easy & Accurate Text Scanning

Xerox, the inventors of OCR technology, introduces new **TextBridge** for Windows. Developed at the legendary Xerox PARC labs, this is the easiest to use interface on the OCR market today! Its consistent recognition accuracy and simplified interface gets you up and working, fast. **TextBridge** employs powerful Lexifer™ technology to identify patterns or classes of information such as postal codes to achieve higher accuracy than the leading OCR packages. **TextBridge** is the answer for *real-world* document processing challenges! The best OCR for reading poor-quality faxes!

ENVISIONS EXCLUSIVE!

- "Print Scan" feature, only available with ENVISIONS scanners, lets you perform OCR within any Windows application! Simply 'Print' your scanned document in its "Image state" to **TextBridge's** OCR processor
- Simple one-button operation lets you get up and running immediately—just press "GO!"
- Scan text directly into Word™ for Windows, WordPerfect™, AmiPro™
- Recognizes text in English, German, Spanish, French (Italian available)
- Perfect recognition an skewed text—crucial for automatic document feeder processing and recognition of crooked photocopies. *Documents can even be read upside down!*
- Reads mixed type, graphics or multi-columns—dark, smudged, degraded, broken text is OK!



Easy interface gets you going fast!

A $600 value!** Free **with ENVISIONS 6100 and 8100 scanners! Upgrade to full Photoshop for just $295! You get full Photoshop** Free **with the ENV24Pro — an $895 value!

A $99 value!** Free **with all ENVISIONS flatbed scanners! Upgrade your existing scanner or fax card with TextBridge's OCR capabilities for only $99. Part# XER1001

ENVISIONS
Scanner Solutions Made Easy

Questions? We love questions!SM Call our scanner hotline:
(800) 926-SCAN (7226)
Local (415) 692-9061 • Fax (415) 692-9064
Envisions Solutions Technology, Inc., 822 Mahler Road, Burlingame, CA 94010

This ad was created using ENVISIONS' scanners! The photos were scanned into Adobe Photoshop.™

MasterCard VISA FEDERAL EXPRESS

Shipping Hand Scanners!

ENVISIONS' Bundles Are More Logical Than Logitech™

By Far!

When compared against eight other hand scanners, including the ScanMan Model 256, "The ENV256 is a bargain."—PC Computing 7/92

Grayscale

ENV256 Grayscale Scanner and Software Bundle!
ENV256 Scanner, HALO Desktop Imager, Perceive Personal OCR, Clip Art Library, ScanPad
Total Value $557

$179 On Sale! Was $199

EST4830B

Let's be reasonable. Both ENVISIONS and Logitech offer terrific handheld scanners with premium software to scan text and graphics. They both can scan full pages using automerge technology. Then why does Logitech make you pay so much more? We can't figure it out either. It's *not logical!*

Features and Bundled Items:	ENVISIONS ENV256™	Logitech ScanMan™256	ENVISIONS ENVColor™	Logitech ScanMan™Color
Resolution	Up to 400 dpi	Up to 400 dpi	Up to 800 dpi	Up to 400 dpi
Grayscales/Color Capability	256 Grayscales	256 Grayscales	16.7 Million Colors	16.7 Million Colors
Automerge/AutoStitch	✓	✓	✓	✓
Image Editing Software Included:	Halo Desktop Imager PC Magazine's Editors' Choice	FotoTouch by Logitech	Halo Desktop Imager PC Magazine's Editors' Choice	FotoTouch Color by Logitech
Text Scanning Software Included:	Perceive Personal	Catchword Pro by Logitech	Perceive Personal	Available at additional cost
Free Clip Art Library & ScanPad	✓	Available at additional cost	✓	Available at additional cost
Your Price	**$179.00**	**$279.99***	**$299.00**	**$524.99***

*Average of 3 prices quoted by Egghead Software stores in the San Francisco/Bay Area on 9/9/93. Hand scanner bundles require 386 or higher, Windows 3.1, 4MB RAM, 8MB hard disk space free

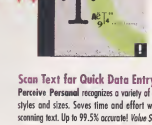
Color

ENVColor Scanner and Software Bundle!
ENVColor Scanner, HALO Desktop Imager, Perceive Personal OCR, Clip Art Library, ScanPad
Total Value $804

$299

EST4460B

Your scanner comes bundled with text scanning software, image editing software, plus a scanpad and clip art library!



Ready-To-Scan Images with Neat ScanPad, Free!

Over 13 categories of hundreds of images. The **ScanPad** holds pages while scanning. *Value $39.95*

Scan Text for Quick Data Entry

Perceive Personal recognizes a variety of text styles and sizes. Saves time and effort when scanning text. Up to 99.5% accurate! *Value $195*

Automatically Merge Multiple Scans and Create Posters

HALO Desktop Imager brings full desktop scanner power to your hand-held! *Value $139*

One Year Warranty!

"I am thrilled with my ENV256 and software. (It) allows me to perform a wonderful variety of things at a reasonable price."
—Bob Temple, Hackettstown, NJ

"ENV256 installed easily and worked wonderfully. Documentation was good. Thanks!"
—Lionel O. Dotson, Sykesville, MD

"The ENV256 is a great product for the price. I was scanning (in) 30 minutes. Thanks."
—Dan Slack, New Church, VA

TWAIN Compatibility

MICROSOFT® WINDOWS™

30 DAY GUARANTEE MONEY BACK

Questions? We love questions!™ Call our scanner hotline:

(800) 926-SCAN (7226)

Local (415) 692-9061 • Fax (415) 692-9064

Envisions Solutions Technology, Inc., 822 Mahler Road, Burlingame, CA 94010

ENVISIONS
Scanner Solutions Made Easy

PC Computing FREE PRODUCT INFORMATION

Circle the numbers below corresponding to products featured in this issue's advertisements and listed in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

Void after February 28, 1994

PRODUCTS FEATURED IN ADVERTISEMENTS

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525
526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615
616	617	618	619	620	621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640	641	642	643	644	645
646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675
676	677	678	679	680	681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700	701	702	703	704	705
706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735
736	737	738	739	740	741	742	743	744	745	746	747	748	749	750
751	752	753	754	755	756	757	758	759	760	761	762	763	764	765
766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795
796	797	798	799	800	801	802	803	804	805	806	807	808	809	810
811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855
856	857	858	859	860	861	862	863	864	865	866	867	868	869	870
871	872	873	874	875	876	877	878	879	880	881	882	883	884	885
886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

Please answer questions below:

1. **Where do you use your computer?** (Check one only)
   A ☐ Home B ☐ Business C. ☐ Both
2. **What kinds of computers do you use?** (Check all that apply)
   D ☐ IBM/Compatible Laptop E ☐ IBM/Compatible Desktop F ☐ MAC
3. **Do you plan to buy any of the hardware or software mentioned below in the next three months?** (Check all that apply)

HARDWARE
G ☐ PC
H ☐ MAC
I. ☐ Laptop
J ☐ Printer
K ☐ Monitor
L ☐ Disk/Tape Back-up
M ☐ Add-in Board
N ☐ Modem
D. ☐ Input Device
P ☐ Local Area Network

SOFTWARE
D ☐ Accounting
R ☐ Spreadsheet
S ☐ Personal Finance
T ☐ Desktop Publishing
U ☐ Word Processor
V. ☐ Database Manager
W ☐ Graphics
X ☐ Utility
Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/ Compiler
2. ☐ Integrated/Multifunction
3 ☐ CAD

4. **From which of the following sources do you purchase personal computer products?** (Check all that apply)
   4 ☐ Specialty Computer Retail Stores
   5 ☐ Mail Order Firms
   6 ☐ Direct from Manufacturers
   7. ☐ Other

PLEASE PRINT CLEARLY PCC 11/93-4

Name

Title | Telephone

Compony Nome

Address

City | State | Zip

☐ Please send me a one-year (12-issue) subscription to PC/Computing for $14.97 (U.S. price); all other countries add $16.00 for additional postage.

Free Product Information

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 433 RIVERTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC Computing
P.O. BOX 1689
RIVERTON, NJ 08077-9689

Free Product Information

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 433 RIVERTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC Computing
P.O. BOX 1689
RIVERTON, NJ 08077-9689

PC Computing FREE PRODUCT INFORMATION

Circle the numbers below corresponding to products featured in this issue's advertisements and listed in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

Void after February 28, 1994

PRODUCTS FEATURED IN ADVERTISEMENTS

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522
526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597

123	124	125	601	602	603	604	605	606	607
148	149	150	616	617	618	619	620	621	622
173	174	175	631	632	633	634	635	636	637
198	199	200	646	647	648	649	650	651	652
223	224	225	661	662	663	664	665	666	667
248	249	250	676	677	678	679	680	681	682
273	274	275	691	692	693	694	695	696	697
298	299	300	706	707	708	709	710	711	712
323	324	325	721	722	723	724	725	726	727
348	349	350	736	737	738	739	740	741	742
373	374	375	751	752	753	754	755	756	757
398	399	400	766	767	768	769	770	771	772
423	424	425	781	782	783	784	785	786	787
448	449	450	796	797	798	799	800	801	802
473	474	475	811	812	813	814	815	816	817
498	499	500	826	827	828	829	830	831	832
523	524	525	841	842	843	844	845	846	847
548	549	550	856	857	858	859	860	861	862
573	574	575	871	872	873	874	875	876	877
598	599	600	886	887	888	889	890	891	892

608	609	610	611	612	613	614	615		
623	624	625	626	627	628	629	630		
638	639	640	641	642	643	644	645		
653	654	655	656	657	658	659	660		
668	669	670	671	672	673	674	675		
683	684	685	686	687	688	689	690		
698	699	700	701	702	703	704	705		
713	714	715	716	717	718	719	720		
728	729	730	731	732	733	734	735		
743	744	745	746	747	748	749	750		
758	759	760	761	762	763	764	765		
773	774	775	776	777	778	779	780		
788	789	790	791	792	793	794	795		
803	804	805	806	807	808	809	810		
818	819	820	821	822	823	824	825		
833	834	835	836	837	838	839	840		
848	849	850	851	852	853	854	855		
863	864	865	866	867	868	869	870		
878	879	880	881	882	883	884	885		
893	894	895	896	897	898	899	900		

PRODUCTS FEATURED IN EDITORIAL

Please answer questions below:

1. **Where do you use your computer?** (Check one only):
   A. ☐ Home B. ☐ Business C. ☐ Both
2. **What kinds of computers do you use?** (Check all that apply):
   D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible Desktop F. ☐ MAC
3. **Do you plan to buy any of the hardware or software mentioned below in the next three months?** (Check all that apply):

HARDWARE
- G. ☐ PC
- H. ☐ MAC
- I. ☐ Laptop
- J. ☐ Printer
- K. ☐ Monitor
- L. ☐ Disk/Tape Back-up
- M. ☐ Add-in Board
- N. ☐ Modem
- O. ☐ Input Device
- P. ☐ Local Area Network

SOFTWARE
- Q. ☐ Accounting
- R. ☐ Spreadsheet
- S. ☐ Personal Finance
- T. ☐ Desktop Publishing
- U. ☐ Word Processor
- V. ☐ Database Manager
- W. ☐ Graphics
- X. ☐ Utility
- Y. ☐ Communications
- Z. ☐ Windows/Multi-tasking
- 1. ☐ Programming Language/ Compiler
- 2. ☐ Integrated/Multifunction
- 3. ☐ CAD

4. **From which of the following sources do you purchase personal computer products?** (Check all that apply):
   4. ☐ Specialty Computer Retail Stores
   5. ☐ Mail Order Firms
   6. ☐ Direct from Manufacturers
   7. ☐ Other

PLEASE PRINT CLEARLY

PCC 11/93-4

Name

Title | Telephone

Company Name

Address

City | State | Zip

☐ Please send me a one-year (12-issue) subscription to PC/Computing for $14.97 (U.S. price); all other countries add $16.00 for additional postage.

BEST PRICES IN TOWN! • (800) 831-8808

CALL FOR UPDATED PRICES

DEE ONE SYSTEMS MONTHLY SPECIALS

SYSTEM	MOTHERBOARD WITH CPU	BASIC SYSTEM	BASIC SYS +40MB HDD +14" MONO & MGP CARD	BASIC SYS + 40MB HDD + SVGA CARD + SVGA COLOR MONITOR	BASIC SYS +80MB HDD + SVGA CARD + SVGA COLOR MONITOR	BASIC SYS +128MB HDD + SVGA CARD + SVGA COLOR MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +130MB HDD +SVGA CARD + SVGA COLOR MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +170MB HDD +SVGA CARD + SVGA COLOR MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +200MB HDD +SVGA CARD + SVGA COLOR MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +250MB HDD +SVGA CARD + SVGA COLOR MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +340MB HDD +SVGA CARD + SVGA COLOR MONITOR
486SLC2-66/64C VLB	$358	$528	$724	$868	$908	$928	$1,128	$1,148	$1,168	$1,188	$1,258
486SLC2-50/64C VLB	308	478	674	818	858	878	1,078	1,098	1,118	1,138	1,208
486DX2-66/128C VLB	568	738	934	1,078	1,118	1,138	1,338	1,358	1,378	1,398	1,468
486DX-50/128C VLB	518	688	884	1,028	1,068	1,088	1,288	1,308	1,328	1,348	1,418
486DX-33/128C VLB	378	548	744	888	928	948	1,148	1,168	1,188	1,208	1,278
486DX2-66/128C EISA	598	768	964	1,108	1,148	1,168	1,368	1,388	1,408	1,428	1,498
486DX-50/128C EISA	548	718	914	1,058	1,098	1,118	1,318	1,338	1,358	1,378	1,448
486DX-33/128C EISA	408	578	774	918	958	978	1,178	1,198	1,218	1,268	1,308
486DX2-66C ISA	508	678	874	1,018	1,058	1,078	1,278	1,298	1,318	1,338	1,408
486DX-50/128C ISA	498	668	864	1,008	1,048	1,068	1,268	1,288	1,308	1,328	1,398
486DX2-50C ISA	392	572	768	912	952	972	1,172	1,192	1,212	1,232	1,302
486DX-33C ISA	322	492	688	832	872	892	1,092	1,112	1,132	1,152	1,222
486SX-33C ISA	192	362	558	702	742	762	962	982	1,002	1,002	1,092
486SX-25C ISA	132	302	498	642	682	702	902	922	942	962	1,032
486DLC-40C ISA	172	342	538	682	722	742	942	962	982	1,002	1,072
486DLC-33C ISA	142	312	508	652	692	712	912	932	952	972	1,042
386DX-40/64C	112	278	474	618	658	678	878	898	918	938	1,008
386SX-40	82	248	444	588	628	648	848	868	888	908	978
386SX-33	72	238	434	578	618	638	838	858	878	898	968

BASIC SYSTEM CONFIGURATION: Motherboard & CPU, 1MB memory, IDE 2HD/2FD controller w/2S/1P/1G, 1.2MB or 1.44MB Floppy Drive, Internal Clock/Calendar, Enhanced Case with Power Supply, and 101-Key Enhanced Keyboard.

LOCAL BUS STOP

486SLC2-50 / 66 .....$1,178 / 1,228
486DX2-66 / DX2-50 ..$1,448 / 1,338
486DX-50/DX-33 .....$1,378 / 1,248

- Local Bus Motherboard
- Local Bus SVGA Card w/1MB
- 64K External Cache
- 130MB IDE Hard Drive
- 4MB RAM
- 1.2MB Floppy Drive
- 1.44MB Floppy Drives
- 101-Key Enhanced Keyboard
- 14" SVGA Monitor (.28DPI)
- IDE 2HD/2FD Controller
- 2S/1P/1G Port
- Desktop or Mini Tower Case w/PS

NEW HARD DRIVES

40mb/28ms (IDE)	$104
80mb/17ms (IDE)	146
120mb/17ms (IDE)	164
130mb/15ms (IDE)	168
170mb/17ms (IDE)	184
212mb/16ms (IDE)	198
250mb/14ms (IDE)	218
340mb/15ms (IDE)	288
540mb/12ms (IDE)	538
200mb/16ms (SCSI)	268
340mb/13ms (SCSI)	388
520mb/12ms (SCSI)	598
1.2GB/13ms (SCSI)	888
1.7GB/13ms (SCSI)	1,128

PRINTERS

Citizen GSX-190 (9-Pin)	$158
Citizen GSX-230 / 240 (24-Pin)	248 / 298
Citizen GSX-145 (24-Pin)	378
Color Option for Citizen Printer	46 / 66
Panasonic KX-P1150 / 2023	148 / 196
Panasonic KX-P2123 / 2124	216 / 316
Panasonic KX-P1624 / 2624	346 / 366

KEYBOARDS

101 Enhanced Keyboard	$18
Maxiswitch	28
MaxiPro II (124 Key Programmable)	68
Keytronics	32
Focus 2001 / 9000	38 / 68
Omnikey 101N / 102 / Ultra	68 / 68 / 98

VIDEO CARDS AND MONITORS

VGA-256K / 512K	$28 / 38
1MB SVGA Card (1024*768*256)	56
Windows Accelerators w/1 MB	58
Cirrus Logic VLB w/1MB	92
Genoa 8520 VLB w/1MB	102
#9 Level 11 / 12 (ISA / VLB)	368 / 438
ATI Graphic Ultra w/Mouse	166
ATI Graphic Ultra Plus w/2MB	246
ATI Graphic Ultra Pro w/2MB	326
ATI Graphic Ultra Pro VLB w/2MB	328
Diamond Speed Star Pro VLB / ISA	118
Diamond Stealth 24VLB w/1MB	154
Diamond Viper VLB w/2MB	384
Orchid Fahrenheit 1280+ w/1MB	144
Orchid Fahrenheit VLB w/1MB	144
Orchid Celsius VLB w/1MB	228
MAG 15F (15") / 17F (17")	498 / 918
Nanao F340W / F550w	678 / 1,078
Nanao T560 / T760	1,668 / 2,398
NEC 3Fge / 4Fge / 5Fge	598 / 698 / 1,078
Sony 1430 / 1604 / 1730	584 / 928 / 984
Viewsonic 4E/5E/5+	278 / 378 / 484
Viewsonic 6E / 7	298 / 898
Viewsonic 15 / 17 / 20	498 / 1,068 / 1,668
Hitachi CM-2095 (20")	1,328
14" VGA (640*480, 0.51)	178
14" Super VGA (1024*768, 0.39)	198
14" Super VGA (1024*768, 0.28)	224
14" Super VGA (1024*768, 0.28) NI	258
15" Super VGA (1280*1024, 0.28)	348
17" Super VGA (1280*1024, 0.28)	648

HARD/FLOPPY DRIVE ADAPTERS

IDE 2HD/2FD Cache Controller	$98
Test Local Bus IDE	34
Adaptec SCSI 1542CK w/Kit (ISA)	238
Adaptec SCSI 1742 (EISA)	348
Buslek SCSI 742A (EISA)	278

MATH COPROCESSORS

8028 / 10	$40
387SX-33 / 25	56 / 54
387DX-40 / 33	60 / 58

MISCELLANEOUS

2400 Modem (w/9600 Send Fax)	28
Fax Modem (9600 Fax, 2400 Modem)	42
Fax Modem (14,400 Fax, 14,400 Modem)	134
3-Button Mouse	9
Logitech Mouseman Serial / Bus	54 / 64
Conner Tape Backup 250MB	138
Colorado Tape Backup DJ-10/20	140 / 168
Colorado Trakker JT-20 (250MB) Ext	348
ATI Sound Card Pro	168
Mitsumi CD-ROM	168
SONY CD-ROM CDU 031A	168
Texel DM5024N SCSI CD-ROM	358
Sound Blaster Pro Deluxe	128
Speaker System	10
Creative Discovery CD 8 / CD 16	368 / 458
16 Bit Ethernet Card Coax/10 Base T	52

VISA

AMERICAN EXPRESS

Dee One Systems

To Order Call

800-831-8808

Inside California or International: 408-262-0836
Service: 408-656-6268 Fax: 408-262-2626
1550 Centre Pointe Dr. Milpitas, CA 95035
M-F 8am-6p Sat 10-4pm PST

- One year warranty/parts & labor for systems
- Knowledgable Technical Support Engineers in service
- 30 days money back guarantee only upon IBM incompatibility reasons
- Prices & availability subject to change w/o notice
- 15% restocking fee on all return items within 30 days. No returns after 30 days
- Shipping , Insurance & COD charges are extra & non-refundable
- Not responsible for typos

HI-TECH USA 1-800-831-2888

Why do smart customers keep buying from HI-TECH USA? Simply because we deliver the best values.

Call and join our smart customer list: ABC, ADAPTEC, ALLIED SIGNAL, AMD, AT&T, CIRRUS LOGIC, DATAQUEST, FLORIDA STATE UNIVERSITY, GENERAL ELECTRIC, IIT, INTEL, LAWRENCE LAB, MAXTOR, NASA, NATIONAL SEMICONDUCTOR, PG&E, QUANTUM CORP, SEAGATE TECHNOLOGY, SIERRA SEMICONDUCTOR, STANFORD UNIVERSITY, SUN MICROSYSTEMS, U.C. BERKELEY, WESTERN DIGITAL, YALE UNIVERSITY, and many, many more.

BEST BUY HI-TECH SYSTEMS

- 64K Cache Expandable to 256K
- 4MB RAM Expandable to 32MB
- 1.2MB & 1.44MB Floppy Drive
- IDE 2HD/2FD Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 130MB 15MS Hard Drive
- 1MB 16-BIT SVGA Card
- 14" .28 SVGA Monitor
- Mini-Tower or Desktop Case
- Enhanced 101-Key Keyboard

486DX2-66 VLB..$1,388
486DX-5D VLB.....1,328
486DX2-50 VLB ...1,248
486DX-33 VLB.....1,188
486SLC2-66 VLB ..1,188
486SLC2-5D VLB ..1,128
486DX2-66 EISA ...1,488
486DX-5D EISA....1,488
486DX2-5D EISA ..1,368
486DX-33 EISA....1,308
486DX2-66 ISA 1,378
486DX-5D ISA 1,318
486DX2-50 ISA....1,248
486DX-4D ISA 1,188
486DX-33 ISA 1,178
486SX-33 ISA 1,058
486SX-25 ISA.....998
486DLC-4D ISA 988
486DLC-33 ISA 968
386DX-40 ISA.....938

YOUR CHOICES

- 14" Non-Int SVGA Monitor.....Add $30
- 15" Non-Int SVGA Monitor.....Add 120
- 14" .39 SVGA Monitor.....Less 20
- Window Accelerator 1MB.....Add 20
- ATI Ultra 1MB .....Add 120
- ATI Ultra Pro 2MB.....Add 290
- 170MB Hard Drive .....Add 20
- 200MB Hard Drive .....Add 40
- 250MB Hard Drive .....Add 60
- 340MB Hard Drive .....Add 130
- Microsoft DOS 6.0 .....Add 50
- 250MB Tape Back-up.....Add 140
- Speaker Systems .....Add 310
- Mitsumi CD-ROM (350MS)....Add 170
- Sound Blaster Pro Deluxe.....Add 130
- Creative Labs Edutainment CD16 Upgrade Kit .....Add 500

EISA (VLB) SCSI SYSTEMS

- Intel Pentium Technology Ready
- NICE EISA VLB Motherboard
- 128K Cache Expandable to 1MB
- 4MB RAM Expandable to 128MB
- 1.2MB & 1.44MB Floppy Drive
- 32 BIT EISA SCSI Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 200MB Fast SCSI Hard Drive
- Diamond Speed Star Pro VLB
- 14" Non-Int .28 SVGA Monitor
- Mini Tower or Desktop Case
- Enhanced 101-Key Keyboard
- Free Microsoft DOS 6.0
- Free Mouse & MS Windows

486DX2-66 ....$1,998
486DX-50 1,948
486DX2-50.....1,858
486DX-33 1,798

YOUR CHOICES

- 15" Non-Int .28 Monitor.....Add $100
- 520MB SCSI Hard Drive.....Add 330
- Diamond Viper VLB w/2MB....Add 270
- Toshiba CD-ROM (200MS) ....Add 400

EISA (VLB) WIN-STATIONS

- Intel Pentium Technology Ready
- NICE EISA VLB Motherboard
- 128K Cache Expandable to 1MB
- 4MB RAM Expandable to 128MB
- 1.2MB & 1.44MB Floppy Drive
- VESA Local Bus IDE Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 200MB Fast IDE Hard Drive
- Diamond Speed Star Pro VLB
- 14" Non-Int .28 SVGA Monitor
- Mini Tower or Desktop Case
- Enhanced 101-Key Keyboard
- Free Microsoft DOS 6.0
- Free Mouse & MS Windows

486DX2-66 ....$1,698
486DX-50 1,648
486DX2-50.....1,558
486DX-33 1,498

YOUR CHOICES

- 15" Non-Int .28 Monitor.....Add $100
- 340MB IDE Hard Drive.....Add 90
- ATI Ultra Pro VLB w/2MB.....Add 220
- Mitsumi CD-ROM (350MS)....Add 170

VESA DELUXE SYSTEMS

- Intel Pentium Technology Ready
- 64K Cache Expandable to 256K
- 4MB RAM Expandable to 32MB
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- VESA Local Bus IDE Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 130MB Fast IDE Hard Drive
- Diamond Speed Star Pro VLB
- 14" .28 SVGA Monitor
- Mini Tower or Desktop Case
- Enhanced 101-Key Keyboard
- Free Microsoft DOS 6.0
- Free Mouse & MS Windows

486DX2-66 ....$1,548
486DX-50 1,498
486DX2-50.....1,408
486DX-33 1,348

YOUR CHOICES

- 14" Non-Int .28 Monitor.....Add $30
- 200MB IDE Hard Drive.....Add 40
- Orchid Fahrenheit VLB .....Add 40
- Mitsumi CD-ROM (350MS)....Add 170

VESA WINDOWS SYSTEMS

- Orchid VLB Motherboard
- 256K High Speed Cache
- 4MB RAM Installed
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- VESA Local Bus IDE Controller
- 2 Serial, 1 Parallel, 1 Game Ports
- 200MB Fast IDE Hard Drive
- Orchid Fahrenheit VLB w/1MB
- 14" NI .28 SVGA Monitor
- Mini Tower of Desktop Case
- Enhanced 101-Key Keyboard
- Free Microsoft DOS 6.0
- Free Mouse & MS Windows

Orchid VLB
486DX2-66 ....$1,748
486DX-50 1,698
486DX-33 1,548

YOUR CHOICES

- 15" Non-Int .28 Monitor.....Add $100
- 340MB IDE Hard Drive.....Add 90
- Mitsumi CD-ROM (350MS)....Add 170
- 250MB Tape Back-up.....Add 140

VESA MULTIMEDIA SYSTEMS

- Intel Pentium Technology Ready
- 64K Cache Expandable to 256K
- 4MB RAM Expandable to 32MB
- 1.2MB & 1.44MB Floppy Drive
- VLB IDE Controller w/2S/1P/1G
- 130MB Fast IDE Hard Drive
- Diamond Speed Star Pro VLB
- 14" Non-Int .28 SVGA Monitor
- Hi-Speed CD-ROM w/2 speakers
- Sound Blaster Pro Deluxe
- Mini Tower or Desktop Case
- Enhanced 101-Key Keyboard
- Free Microsoft DOS 6.0
- Free Mouse & MS Windows

486DX2-66 ....$1,848
486DX-50 1,798
486DX2-50.....1,708
486DX-33 1,648

YOUR CHOICES

- 15" Non-Int .28 Monitor.....Add $100
- 200MB IDE Hard Drive.....Add 40
- Orchid Fahrenheit VLB .....Add 40
- 250MB Tape Back-up.....Add 140

BEST BUY NOTEBOOKS

ACTIVE COLOR MATRIX
486DX-33 .....$2,998
486DX-50.....3,198
486DX2-66 3,298

STANDARD FEATURES

- 4MB RAM expandable to 20MB
- 120MB Hard Drive (200MB, 340MB Hard Drives available)
- 1.44MB Floppy Drive
- 2S/1P/1G
- One External SVGA Port
- One External FDD Port
- One External Keyboard Port
- One 100 - PI N Expansion Port
- 120V/240V AC/DC Adapter
- Built-in Trackball

PAPER WHITE MONO
486SX-25.....$1,628
486DX-33.....1,798
486DX-50.....1,998
486DX2-66 2,098

HI-TECH USA 1-800-831-2888 — WIDE CHOICES AT LOW PRICES

CASE WITH POWER SUPPLY

Mini Tower Case w/200W Power Supply	$56
Desktop AT Case w/200W Power Supply	60
Medium Tower Case w/230W Power Supply	82
Full Tower Case w/250W Power Supply	112

CO-ROM / MULTIMEOIA

Audio Pak (Sound Card, Speaker, Joystick, Earphone)	$58
Creative Labs	
Sound Blaster	64
Sound 8laster Pro Oeluxe	124
Sound 8laster 16 ASP	208
Video Blaster	338
Discovery CD 8 Upgrade Kit	368
Discovery CD 16 Upgrade Kit	448
Edutainment CD 8 Upgrade Kit	458
Edutainment CD 16 Upgrade Kit	498
Mitsumi CD-ROM (350MS)	164
SONY CD-ROM 31A	164
TEXEL	
DM3024N (SCSI) Internal	358
OM5024 (SCSI) External	448
Toshiba XM-34018 (200ms) SCSI	398
Trantor SCSI Host w/Driver	78

CO SOFTWARE TITLES

American Bus Phone 8ook-1992	$22
Animals v1 0 DOS	20
Annabel's Dreams-Egypt	78
Arthur's Teacher Trouble	25
Atlas Pak v3.1 World/US	25
Authorware Star for Windows	48
Barron's College Guide	24
8attle Chess OOS	20
8eyond the Wall of Stars	24
8eauty & 8east MPC	18
8ring the World to Your Senses	15
Campton Family Encyclopedia	38
Campton's Enclyclopedia MPC	60
Carmen San Diego DOS	24
CD Game Pack II DOS	24
CD Storytime OOS	20
Chess master 3000 MPC	22
CIA World Fact 8ook DOS	22
Composer Ouest MPC	30
Oesert Storm MPC/MAC	22
Oictionary of the Living World	30
Dinosaur Adventure	25
Family Choice/8ritannica DOS	22
Family Doctor DOS/MAC	22
Family Education Collections OOS	22
Great Cities-Vol 1 / Vol 2 OOS	22
Guinness Oisk of Records MPC	22
Jets & Props MPC	22
Jones in Fast Lane MPC	20
Killer Truck CD-Music Library	18
King's Ouest V DOS	18
Kodak Photo CO Access	18
Language of the World	34
Library of Future 1st OOS	48
Loom From Lucas Film DOS	20
Lotus 123 v3 1 MPC	84
Macmillan Dictionary For Children	28
Macromedia Action for Windows	28
Mantis Experimental Fighter	16
Mario is Missing/World Atlas 3 2	20
Mavis Teaches Typing MPC	20
Mayo Clinic Family Health	20
Media Clips - 4 Pk MPC/MAC	42
Microsoft 8ookshelf MPC	50
Microsoft Works MPC	50
MIDI Music Shop	20
Mixed-up Mother Goose MPC	20
Monkey Island OOS	22
MPC Audubon's Mammals	18
National Geographic Mammals OOS	24
National Park	20
Ocean Digital Imagery VI DOS	24
PC-SIG 11th ED DOS	20
PC-SIG 12th ED	26
Peter & Wolf MPC	18
Playing with Language (English)	25
Playing with Language (French)	25
Playing with Language (German)	25
Playing with Language (Japanese)	25
Playing with Language (Spanish)	25
Presidents DOS	68
Publish It 2.0 OOS	24

CO SOFTWARE TITLES, CONTINUED

Secret Weapons/Luftwf DOS	18
Sherlock Holmes DOS	18
Sleeping 8eauty	18
So Much Shareware I DOS	18
So Much Shareware II DOS	24
Sound Library MPC	15
Space Adventure	28
Space Ouest IV By Sierra DOS	25
Sport's 8est (3 in 1) DOS	20
Stellar 7 DOS	18
Survey of Western Art MPC	28
The Seventh Guest	58
The Right College	25
Time Almanac 1991 DOS	18
Time Table of History OOS	18
Tool Works Reference Library	20
Tool Works Encyclopedia MPC	48
Total 8aseball DOS/MAC	24
US Atlas v3 1 MPC	18
US Atlas & Automap DOS	24
US History OOS/MAC	24
USA Wars. Civil War DOS/MAC	30
USA Wars Vietnam DOS/MAC	30
USA Wars WW II OOS/MAC	30
USA Wars Korea	30
Vital Signs MPC/MAC	78
Whale of Tale	68
Wild Places DOS	15
Willy 8earnish The Adventure	20
Wing Command & Ult VI DOS	25
Wizard PC/MAC	15
World Atlas v3 2 MPC	16
World View OOS	15

CONTROLLERS

IDE 2FD/2HD with 2S/1P/1G	$15
IOE 2FD/2HD Cache Controller	98
IDE with I/O for VESA Local 8us	38
Adaptec	
1542CK w/Kit (SCSI)	248
1542C (SCSI)	198
1742A EISA (SCSI)	348
8ustek 742A EISA (SCSI)	278
8ustek 445S VL8 (SCSI)	278
DTC EISA IDE / SCSI	98 / 448

HARO ORIVES

40M8 25MS IDE	$108
80M8 19MS IDE	154
120M8 19MS IDE	168
130MB 15MS IDE	178
170M8 17MS IDE	194
212M8 15MS IDE	208
250M8 15MS IDE	228
340M8 12MS IDE	298
540M8 12MS IDE	548
212M8 15MS SCSI	278
520M8 12MS SCSI	608
1.2GB 13MS SCSI	898
1.7G8 13MS SCSI	1,138

KEYBOAROS

Focus	
FK2001 101-Key Click	$40
FK9000 Programmable w/Calculator	60
Keytronics 101-Key Enhanced	32
Mitsumi 101-Key Enhanced	20
Maxiswitch 101-Key Enhanced	28
Northgate	
OMNI 101 NI	70
OMNI 102	70
OMNI Ultra T or F	100

MATH COPROCESSORS

387DX-40	$62
387DX-33	60
387SX-33	58
387SX-25	56

MOOEMS & FAXES

2400 Modem (w/9600 Send Fax)	$30
Fax Modem (9600 Fax/2400 Modem)	44
Fax Modem (14,400 Fax/14,400Mdm)	134
Pocket Fax Modem Send & Receive	208
Hayes	
Accura 14400 Fax Modem Int	228
Accura 14400 Fax Modem Ext	248
Optima 14400 Fax Modem	368
US Robotics	
Sportster 9600 Modem Int	148
Sportster 14400 Modem Int	158
Sportster 14400 Modem Ext	178
Sportster 14400 Fax Modem Int	168
Sportster 14400 Fax Modem Ext	188

MONITORS

14" Mono Amber	$88
14" VGA (640•480) 51	180
14" Super VGA 1024•768 39	200
14" Super VGA 1024•768 28 Int	240
14" Super VGA 1024•768 28 NI	280
15" Super VGA 1280•1024 28 NI	358
17" Super VGA 1280•1024 26 NI	658
CTX	
14" Super VGA 1024•768 28 Int	258
14" Super VGA 1024•768 28 NI	278
CMS1561 15" 1024•768 28 NI	388
CMS1561LR 15" 1024•788 .28 NI	408
CPS1760 17" 1280•1024 28 NI	708
CPS1760LR 17" 1280•1024 MPR II	808
Hitachi	
CM1584MV 15" 1280•1024 28 NI	478
CM1785MV 17" 1280•1024 28 NI	928
CM2095 20" 1280•1024 28 NI	1,328
CM2187M 21" 1600•1280 Microp	2,148
MAG	
MX15F 15" 1280•1024 28 NI	498
MX17F 17" 1280•1024 26 NI	918
NANAO	
F340IW 15" 1024•768 .28 72Hz	678
F550I 17" 1280•1024 .28 NI	1,018
F550IW 17" 1280•1024 28 75Hz	1,088
T560I 17" 1280•1024 26 TRIN	1,678
T660I 20" 1280•1024 31 72Hz	2,418
F750I 21" 1280•1024 31 NI	2,048
NEC	
3FGe 15" 1024•768 28 NI	588
4FGe 15" 1024•768 28 NI	688
5FGe 17" 1024•768 28 NI	1,078
6FG 21" 1280•1024 28 NI	2,298
SONY	
1430 14" 1024•768 25 NI	588
1604S 17" 1024•768 .25 NI	928
1730 17" 1024•768 .25 NI	988
VIEWSONIC	
4E 14" 1024•768 28 Int	288
5E 14" 1024•768 .28 NI	378
5+ 14" 1024•768 .28 NI	468
6E 14" 1024•768 .28 NI	308
7 17" 1280•1024 .28 NI	878
15 15" 1280•1024 28 NI	498
17 17" 1280•1024 28 NI	1,078
20 20" 1600•1280 28 NI	1,678

MOTHERBOARDS WITH CPU

386SX-33	$78
386SX-40	88
386DX-40/64K Cache	118
486SX-25/128K ISA	188
486SX-33/128K ISA	248
486DLC-33/64K ISA	148
486DLC-40/64K ISA	188
486OX-33/128K ISA	378
486DX2-50/128K ISA	438
486DX-50/128K ISA	518
486DX2-66/128K ISA	568
486DX-33/128K EISA (NICE)	498
486DX-50/128K EISA (NICE)	638
486DX2-66/128K EISA (NICE)	708
486SLC2-50/64K Local 8us	318
486SLC2-66/64K Local 8us	378
486DX-33/64K Local 8us	388
486DX2-50/64K Local 8us	468
486DX-50/64K Local Bus	528
486DX2-66/64K Local 8us	578

MOUSE

3-8utton Microsoft Compatible	$10
Logitech	
Cordless	88
Mouseman Serial/8us	54 / 64
Trackman	78
Scanman 256	248

NETWORK

8 8IT Ethernet Cards (NE1000 Compatible)	$46
16 8IT Ethernet Cards (10 8ase-T/Coax)	55
16 8IT Ethernet Cards (Pocket for Notebook)	148
16 8IT 8usmaster (NE2100 Compatible)	88
ANSEL	
P-NS2000-8A 10 8ase-2 & AUI	98
P-NS2000-TA 10 8ase-T & AUI	98
P-NS2000-3 10 8ase-T & 2 & AUI	128
P-ENET-3200 (EISA)	268
P-ENET-M2900 Hub w/8 108ase-T, 1-108ase-2, 1-10Base-5	278
ARCnet	
4-Port Passive Hub	15
8-Port Active Hub	118
8us Topology 8 8IT ISA Card	48
8us Topology 16 8IT ISA Card	58
Star Topology 8 8IT ISA Card	48
Star Topology 16 BIT ISA Card	58
8ootROM	
8 8IT Auto 8oot PROM	15
16 8IT Auto 8oot PROM	15
Hubs and Repeaters	
4-Port 10 Base T HU8	148
6-Port 10 8ase T HU8	208
12-Port 10 8ase T HU8	438
Daughter Card, 4 Additional RJ45 Ports	68
Daughter Card, BNC+AUI Ports	58
2 8NC Ethernet Repeater	198

PRINTERS

Citizen	
GSX-190 (9-Pin)	$158
GSX-230 (24-Pin) Ouiet	248
GSX-240 (24-Pin) Ouiet	298
GSX-145 (24-Pin) Wide	378
Color Option for Citizen Printers	48/68
Panasonic	
KX-P1150 (9-Pin)	138
KX-P1624 (24-Pin) Wide	348
KX-P2180 (9-Pin)	158
KX-P2023 (24-Pin) Ouiet	198
KX-P2123 (24-Pin) Color Capacity	228
KX-P2124 (24-Pin) Color Capacity	328
KX-P2624 (24-Pin) Ouiet Wide	378
Color Upgrade Kit KX-PCK11	48

TAPE BACKUP

Conner 250M8 Int	$138
Colorado	
DJ-10 Tape 8ack-up 120M8	138
OJ-20 Tape 8ack-up 250M8	168
KE-9 Ext Kit for DJ-10/Dj-20	68
Tape OIC-80 3M DC2120	20
JT-10 Trakker 120M8 Ext	298
JT-20 Trakker 250M8 Ext	348
PT-25 Power Tape 2 4G8 Int	988
PT-50 Power Tape 4G8 Int	1,498

VGA CAROS

VGA256K 800•600 16 8IT	$30
SVGA 512K 1024•768 16 8IT	40
SVGA 1M8 1024•768 16 8IT	56
Window Accelerators w/1MB	58
Cirrus Logic VLB w/1M8	90
Trident VLB w/1M8	80
ATI	
Graphics Ultra 1M8 w/Mouse	168
Graphics Ultra Plus 2MB	248
Graphics Ultra Pro 2M8 (ISA)	328
Graphics Ultra Pro 2M8 (VL8)	328
Graphics Ultra Pro 2M8 (EISA)	368
Diamond	
Speed Star Pro ISA 1MB	114
Speed Star Pro VL8 1M8	114
Stealth 24 VL8 1M8	158
Stealth Pro VLB 1M8 (VRAM)	268
Stealth Pro VL8 2MB (VRAM)	338
Viper VL8 2M8	378
Genoa	
8500 VLB 1M8	100
Orchid	
Celsius VLB 1M8	238
Fahrenheit 1280 Plus 1M8	144
Fahrenheit VL8 1M8	144.
Fahrenheit VA (S3-801) 1M8	148
Fahrenheit VA VLB (S3-805) 1MB	158

Order Number 1-800-831-2888
Inside California..........................(408) 262-8688
Technical & Service ....(408) 956-8285
International Orders ....(408) 262-8688
FAX Orders...................................(408) 262-8772

HI-TECH USA

1562 Centre Pointe Drive
Milpitas, CA 95035

HOURS **Monday - Friday: 8am to 6pm (PST)**
Saturday: 10am to 4pm (PST)

TERMS AND CONDITIONS

1. Lifetime technical support.
2. One year parts, and labor warranty on systems.
3. 30 days satisfaction money-back guarantee.*
4. We customize to your requirements.
5. Combinations of the best state-of-the-art components.
6. 72 hour burn-in test.
7. World wide shipping.
8. Replacement parts shipped at no cost to you.
9. Superior reputation for service, quality & value.
10. Purchase orders are welcomed and subject to approval.

Terms and Conditions: ● Prices and specifications subject to change without notice. ● *Guarantee will be honored only for IBM incompatibility reasons, covers only Hi-Tech USA brand computers, and excludes computer peripherals, software, and shipping charges. All other returns subject to 15% restocking fee. No refunds after 30 days. ● Return shipping must be insured, pre-paid and bearing an RMA# on the shipping label. ● Defective items replaced or repaired at our discretion. ● All logos and trademarks are registered trademarks of their respective companies.

PC DISK-COUNT SOFTWARE

Lowest delivered prices with great customer service.

800-448-6658

HOURS: M-F 9 AM - 8 PM EST AND 10 AM - 3 PM EST
PRODUCT INFO & OTHER BUSINESS: 908-396-8880

NO SURCHARGE
SHIPPING IS ONLY $4.00 PER ORDER, NOT PER ITEM
HARDWARE INCLUDED!!!

CALL FOR FREE CATALOG · CHECKS · MONEY ORDERS · COD · PO'S · CREDIT CARDS · MasterCard · VISA

Lotus SmartSuite

LOTUS Smartsuite v2.0 ..Lotus 123, Ami Pro, CC, Mail, Freelance Graphics 425
Upgrade 353

Q & A v 4.0..The #1 Database and Word Processor built for Business. Ready to use Client Tracking, Inventory,sales, Mail List & More 199

Hello Music ..Complete with One Generator & easy to use "Player" software. 192 sounds. Connects to serial port 277

BORLAND C++w/Applications Framework

Professional development system for DOS & Windows 479

SUMMIT MEMORY SYSTEMS INC

SE120 AT	149
SE 120 PS/2	179
SE250 AT	209
SE250 PS/2	219
Accelerator Board	79
SE305 IDE	259
SE305 IDE Tape Controller	79
External Case	69
Formatted QIC-40 Tapes	
Formatted QIC-80 Tapes	
Formatted SMS-101 Tapes	
Cleaning Kits,Flat & Rotary,Kit Avail.	

CENTRAL POINT PC TOOLS FOR WINDOWS

DOS VERSION AVAILABLE ... YOUR WORK ON MINIMUM

P C Tools v8.0 ..265ms Access Speed, 300 Kbaus transfer rate, 64K buffer, X/A mode 369.95

Networks

Lantastic
NE 2000 Card 69
Noderunner 173
AE-2 129
AI DOS 65
Ai Win 76
2000D Strt Kit 439

Modem & Fax

Complete
Communicator 119
Comm. Gold 199
MaxFax 9624 F/M 89
Multite 9624CPQ 149
Maxite 96/96 349
Maxite 14.4/14.4 419
US Robotic Sportster
2400 Ext. 106
2400 Int. 99
14.4 x 42bs 162
w/ S/R Fax 183
14.4 Ext 185
w/ S/R Fax 213
Zoom Internal 62
Zoom Internal 59

Scanners

Scanmaster II 859
Scanmaster II XE 1189
Scanman 32 104
Scanman 32w 174
Scanman 256 OCR 219
Scanman Color 435

Mice & Trackball

Appoint Mouse/Pen 59
Gold Mouse 33
Microsoft Mouse 119
Mouseman Serial 59
Trackman Serial 79

Multimedia

Video
Audio Show 369
Pro 256 289
Pro Color Plus 529
ProVGA TV 453
Pro PG/TV + 2659
Pro VGA/TV + 859
Video Blaster 658
w/ SVHS 799
Video Weaver 419
TVGRX TV 269

MM Software

Action 329
Animation World 62
Interactive 2.0 374
Ask Me 2000 265
Autodesk Mid Expr 129
Clipmedia 265
Clipart Cat 109
Make Your Point 69
PC Animate 164
Studio Publisher 534

CD DRIVES

Toshiba
Dbl Speed Int 489
Dbl Speed Ext 594

Texcel America
3024 Dbl Spd 390
3024 Business 679
3024 Education 604
3024 Home 569
3024 Multimedia 844
3024 Dbl Spd 495
3024 Business 769
3024 Education 729
3024 Home 675
3024 Multimedia 940

Sound Cards

ATI Stereo F/X 139
SoundEsp CD 149
Covox Voice Blstr 64
Gravis Ultra Sound 123
Gravis Ultra Sound Max 439

Media Vision
Pro Audio Spectr 349
CD Upgrade Kit 935
Pro Movie Audio 329
Logitech Portable 134
Sumasonic 139
Sound Blaster
SB Mid Int 95
Sound Blast Pro MCA 259
Sound Blaster Delx 132
SB Pro 16 164
SB Pro16 ASP 209
SB Discovery 16 429
SB Edutainment 16 579
SB Pro Studio 16 1149
SB CDROM Intrnl 369
SB Cons.CD Drive 341
SB Portbloster 149

Hardware

Speaker 95
Organizer 94
Smartpad 94
Smartsuite 425
Symphony 482
Works 3.0 95
Money Manager 95
Sidekick Jr 49
Math Cad Dos/Win295

Micrographix
Charisma 315
Designer 459
Graphic Works 184
Photomagic 99
Picture Publish 419

Microsoft
Access 95
CD++ Complete 439
Cobol Complete 569
DOS 6.0 Upgrd 49
Elcms Designer 247
Entertainment Pak 289
Excel Win 289
Fortran Complete 95
Fortran Powerstat 165
FoxPro 2.5 305
FoxPro 2.5 Win 305
FoxPro Dbase IV 305
Macro Assembler 129
Money Win 15
Office Win 474
Office Pro 598
Powerpoint Win 305
Profit Win 99
Project Win 99
Publisher Win 89
Publisher Design 45
Quick Basic 129
Quick C 64
Quick Pak Prof 125
Scores (ea) 22
Schedule + Win 123
S D K 219
Soundbits 27
Tm Type Fonts 45
Video Win 119

Hardware

Perform Pro Win 175
Perform Pro Plus 239
PFS: Business Pkg 42
PFS: First Choice 41
PFS: First Publish 41
PFS: Preface 19
PFS:Prospect 41
PFS: Publisher 41
PFS:Resum & Jobs 41
PFS: Window Wrk 41
PFS: Write 41
Photo Finish 125
Pizazz Plus 79
Power Translator 159
Presentain Tsk Frc 119
Print Cache 3.1 44
Print Shop 36
Print Shop Deluxe 49
Procomm Plus 0.99
Procomm Plus Win 96
Professional Write 195
Professional Write 159
Protext Write Plus 159
Publish - It
Publishr Paintbrsh 309
Publishr Type Frndry 309
Pyro Screen Saver 33
Q & A 199
Q & A Lan Pack 97
Q A Plus 88
Q A Plus Windows 89
Q DOS 3 55
Q DOS Collection 108
QEMM 7.0 79
QModem 59
QRAM 7.0 49
Quark Express 559
Quattro Pro 4.0 97
Quattro Pro Win 97
QuickBooks 84
QuickBooks Pay 49
Quicken 6.0 42
Quicken Window 41
Quicken Business 59
QuickInvoice 26
QuickPro 27
Quick Schedule 86
Screen Extendr WP 62
SideKick 55
Sideways 25
Simply Account 129
Stellar Elite 14
Software Carousel 55
SpinRite 3 77
SQZ 65
Stacker 3.1 89
Stacker DOS 232
Superbase 2 544
SuperCalc 59
Superstor Pro 82
Timeline DOS/Win 443
Timeslips III 185
Toolbook 279
Toolbook Multimd 495
True Type DOS 42
Turbo Cad 79
Turbo C++ 59
Turbo C++ Visual 79
Turbo Pascal 103
Turbo Pascal Win 103
Ultra Fax 76
Utrinsic Laptop 60
Ventura Gold 4.0 509
Visio 199
Webster Elec Dict 57
Windows Draw 99
WinFax Pro 76
WinRix 235
WinSleuth Gold 91
WP Deluxe 43
Win Tools 119
Word Perfect 6. 229
Word Perfect Win 279
Word Perf Node 179
Wordperfect Mail 87
W P Office LAN 289

Forgemaker 49
Harvard Graphic 84
Harvard Grph Win 84
Laplink
Lotus 1-2-3 v2.4 99
1-2-3 v3.0 149
1-2-3 Win 99
Ami Pro 3 69
Freelance 89
Smart Suite 349
Smart Suite 353
Symphony 99

Microsoft
Access 139
Access Ver 1.1 44
C/C++ Compilr 133
Excel 4.0 99
Fortran Pwrsta 187
Compl Upgrd 234
FoxPro 2.5 189
FoxPro Ver Up 54
Macro Assembly 129
Office 354
Powerpoint Win 123
Publisher 149
S/W Develo Kit 99
Visual Basic 284
Visual Basic Pro 195
Visual C++ 149
Visual C++ Win 124
Windows 3.1 52
Windows NT 274
Word DOS 84
Word for Win 122
Word Pro 99
Works for Win 75
Workpoint 79
OS/2 Upgrade 97
Paradox v4 189
Powerhouse 189
Picture Publisher 189
Professional Draw 125
Q & A 99
QEMM 7.0 49
Quarterdeck
Quarterdeck Office 59
Quicken 6.0 42
Quicken Window 41
Quicken Business 59
QuickInvoice 26
QuickPro 27
Quick Schedule 86
Screen Extendr WP 62
SideKick 55
Sidekick Jr 49
Simply Account 129
Stellar Elite 14
Software Carousel 55
SpinRite 3 77
SQZ 65
Stacker 3.1 89
Stacker DOS 232
Superbase 2 544
SuperCalc 59
Superstor Pro 82
Timeline DOS/Win 443
Timeslips III 185
Toolbook 279
Toolbook Multimd 495
True Type DOS 42
Turbo Cad 79
Turbo C++ 59
Turbo C++ Visual 79
Turbo Pascal 103
Turbo Pascal Win 103
Ultra Fax 76
Utrinsic Laptop 60
Ventura Gold 4.0 509
Visio 199
Webster Elec Dict 57
Windows Draw 99
WinFax Pro 76
WinRix 235
WinSleuth Gold 91
WP Deluxe 43
Win Tools 119
Word Perfect 6. 229
Word Perfect Win 279
Word Perf Node 179
Wordperfect Mail 87
W P Office LAN 289

UPGRADES

Alpha Four 95
Approach 139
Arts & Graphic 145
Borland Office 294
Clipper Ver Upgd 142
Communication Pak
Ingr Winfax, Superstor 139
& Crosstalk Win 139
Corel Draw 4 229
dBase IV 95
Designer 4.0 189

Pictur Publisher 189
Professional Draw 125
Q & A 99
QEMM 7.0 49
Quattro Pro 4.0 97
Quicken 6.0 42
Quicken Window 41
Quicken Business 59
QuickInvoice 26
QuickPro 27
R Base 185
Stacker 232
Superbase 2 139/185
Word Perf 6/Win 103
WP Presentation 59
Wordstar 7.0 75
Zortech C++ 189

Score: 1760 Randolph Ave. Rahway N.J.

MIDI Software

Ballade Windows 79
Band in a Box 69
Boom Box 69
Cadenza Windows 189
Cakewalk 69
Cakewalk Win 129
Cakewalk Dos 69
Cakewalk Pro Win 240
Cubase 215
Encore 379
Fast Fingers 79
Jammer Pro 125
Master Tracks Pro 249
Music Time 49
Music Printer Plus 359
Music Quest 169
Musicator GS 215
Piano Works 79
Play It by Ear 69
Quick Score Deluxe 99
Recording Studio 75
Rhythm Ace 69
Songwright 5 89
Trax for Windows 85

MIDI Interface

Midiator 101 Serial 95
Music Quest Midi 179
Pro Mid 149
2 Port SE 149
Hello Music 277
The Miracle 325

Skins & Pads

Just Laptops 19
Grounded Wrist Strap 9
Keyboard Skins 15
Static Pad 15

Mouse Pads

Static (Dust Repellent) 5
Mouse Pad 3
Cleaning System 15

TERMS AND CONDITIONS

Master Card, Visa, American Express & Discover Accepted. No surcharge on Credit Cards. By mail: P.O. Box 1760, Rahway, N.J. All sales are final. NO REFUNDS! Exchange on defective merchandise with the same item only, no exceptions. All Products are new from manufacturer. All claims and guarantees are from the manufacturer. Call for current price and availability. COD$30.00 AND SCHOOL P.O.'s WELCOMED. For your protection, we will only ship to the address the credit card company has on file, therefore shipping to Ak., Hi., Apo, Fpo, Canada, APO/FPO extra. International orders call for shipping charges. N.J. Residents add 6% sales tax. 20% restocking fee for all refunded items

Circle 244 on reader service card.

ADVERTISER INDEX

	READER SERVICE	PAGE NUMBER
3M	163	359
Abacus	111	439
Aberdeen Inc.	*	508
Acer America	*	321-324
Adobe Systems	168	281
Advanced Logic Research	142	33
Aldus Corp	*	220-221
AMBRA Computer Corporation	*	68-71
	*	82-83
AMDEK	193	503
America Online, Inc.	*	427-428
American Power Conversion	116	255
American Small Business Camp.	166	227
AMS, INC.	206	440
Arabesque Software, Inc.	118	203
Ares Microdevelopment, Inc.	*	468-469
Arlington Computer Products	161	484-485
ARNET	*	502
AST COMPUTER	*	50-51
Asymetrix	*	386-387
AT&T Paradyne	191/192	160
	210/211	253
ATI Technologies Inc.	112	123
Bandwell	132	470-471
Borland International	167	178
	218	31
Buffalo Products	258	488
Caere Corp	261	224-225
Canan Computer Systems, Inc.	*	234-235
Citizen America Corp	249	73
Clear Software	183	32
Calarada Memary Systems	184	391
Campaq Camputer	231	4-5
	232	6-7
	108	407
	115	408-409
	120	410
Campudyne	195	180-181
Campuserve	128	365
Computability	*	442-445
Computer Associates	213	49
Computer Book Club	178	481-483
Computer Clipboard	*	438
Computer Discaunt Warehause	133	489
	134	490-491
Comtrade	158	504-505
Canner Peripherals	122	338
	*	345-356
Cannexperts	257	100
Carel Carp.	209	229
	157	472
Carnell Camputer Systems	250	474-475
Creative Labs	187	147
	271	278-279
Curtis	*	11
DacEasy	229	249
Dee One Systems	*	515
Dell Camputer Carp.	*	162-165
	*	167
	*	C5-C8
Deneba Systems, Inc.	180	57
Digital Direct	270	113-120
Disk-Count Saftware	244	518
Dustin Discaunt Saftware	129	2
	117	3
	126	42
	145	456-457
	176	458
Dustin Discaunt Saftware	177	459
	124	48
Eastman Kadak Campany	247	44-45
Eclipse Systems	228	207
Electrified Discaunters	*	473
Envisions	*	509-512
Epsan	*	134-135
Ergadyne	160	46-47
Expo Tech	*	461
	196	462
	197	463
	198	464
	201	465
	200	466
	199	467
Fifth Generation Systems	238	151
First Source International	*	480
Franklin Quest Ca.:	119	273
Gateway 2000	*	17-29
	*	413-418
Gold Disk Saftware	148	239
Hayes Miracamputer Products	162	75
Hewlett Packard	*	77-80
Hi-Tech USA	*	516-517
IBM	*	243-248
	*	102-103
IBM PC Direct	*	265-268
IBM Persanal Saftware Products	*	127
INMAC	*	373-376
Innavation Camputers	*	441
Insight SuperDirect	103	496
Intel PCED	147	269
Intergraph Carparation	127	262-263
Intuit, Inc.	*	124-125
	*	85
JDR Microdevices	153	498
Kensingtan Micraware	245	343
L.A. Trade	*	446
LANDMARK/Supersaft	189	497
Lexmark (Printers)	226	108-109
Lagical Cannectian	125	488
Logitech	130	209
Latus	*	204-205
Latus Develapment Carp	*	105
	*	314-315
	*	380-381
	*	402-403
	*	87-97
Mag Innavisian	181	357
Media Magic	113	121
Media Visian	154	383
	156	66
Megahaus	105	492-493
	106	494-495
Merritt Camputer Products	102	30
Microbiz Carp	109	478
Micrografx	260	133
Micran Computer Inc.	253	211
	254	212-213
	255	214
Micrasaft	*	149
	*	169-176
	*	284-287
	*	337
Micratek Lab, Inc.	185	155
Midwest Micra-Peripherals	276	451
	272	452-453
	237	454-455
Mitsubishi Display Praducts	194	295
Nanaa	212	188-189
NCR Carp.	*	393-396
NEC Technalagies	219	129
	220	130-131
	275	14-15
	243	290-291
	121	C2-PG1
	*	137-144
New Vision Technalagies Inc.	267	412
NRI Schaals	*	447-449
Okidata	175	13
	182	187
One Write Plus, Inc.	*	397
Pacific Crest Technalagies	256	99
Pacific Data Products Inc.	*	399
Panasanic	205	274-275
Patten & Patten	224	390
PC Zane	259	499-500
PC/Camputing	*	423
	*	297
Pennant Systems	*	61
PowerSaft	214	161
Praxima	171	193
Quantex	222	476-477
Quarterdeck Office Systems	174	369
Rose Electranics	169	392
S.A.G. Electranics	*	460
SBT	202	231
Seika Instruments	262	254
Sigma Designs	136	419
	179	421
Shapeware	186	251
SmartPrint	107	30
SafNet, Inc.	246	233
Saftware Publishing	*	256-258
Sany Carparatian	269	240-241
Surplus Saftware Int'l	110	501
Symantec	140	159
	263	271
Symantec Carparatian	143	111
Tandy	190	330-331
TC Camputers	*	506-507
Teleware	*	277
Texas Instruments	268	292
	104	450
Texel	252	153
The Complete PC	207	377
	139	420
TigerDirect	149	432
	241	433
Tashibo America, Inc.	215	385
Traveling Saftwore,inc.	137	219
Twinhead Carp.	242	261
UMAX	172	237
US Rabatics	164	296
USA Flex	239	486
	240	487
Verbatim Carp	144	401
ViewSanic	150	217
WardPerfect Carparatian	*	197-199
Worldwide Technalagy	251	479
Xircam	264	305
Zeas Int'l	170	157
	248	35
	265	36-37
	216	38-39

Direct to You Section 479-519
PC/Computing Marketplace 520-545

PC Computing

Marketplace

Advertising Account Representatives

Glenda Campbell	Account Representative	212-503-5173
Christina Finelli	Account Representative	212-503-5133
John Spingler	Account Representative	212-503-5114
Kevin Tracey	Account Representative	212-503-5102
Jonathan Schwartz	Account Representative	212-503-5101

Windows/Premier

The color showcase that puts the spotlight on leading-edge PC products and services.

520-539

Classified

Flexible-format display advertising: computer systems, components, software and more.

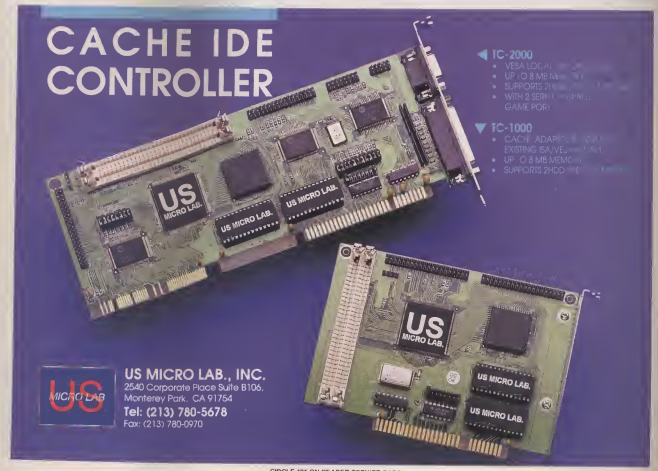
540-545

National Advertising Staff 1-800-825-4237

Robert A. Bader VP, Central Advertising
Georgie Seitz Sales Manager
Bessi Dion Asst. Prod. Manager
Melissa Casey Ad Coordinator

Index

	Premier	Classified
HARDWARE		
Boards/Components/Chips	522	
Multi-media		
Communications	525	
Voice Mail	525	
Computer Systems	526	540
Input/Output Devices	527	540
Bar Coding	528	540
Mass Storage Devices	528	
Midi	528	
Networking		
Security		
Video	529	540
SOFTWARE		
Artificial Intelligence		540
Business Applications	529	541
Accounting		
Communications	530	541
Education	531	542
Graphics/Design	530	542
Multi-media	532	542
Personal	533	
Foreign Languages	534	
Religion	533	
Public Domain		542
Scientific		
Security		
Shareware		542
Systems/Languages		
Utilities	535	544
Vertical Applications		
Adult	538	545
Entertainment		
Windows	521	
SUPPORTING PRODUCTS		
Information Resources	537	544
Services	538	544
Supplies		544



CIRCLE 401 ON READER SERVICE CARD

The Next Generation Publisher...

PagePlus 2.0 for Windows

SPECIAL OFFER $59.95 BUY DIRECT

WINDOWS

PagePlus 2.0 is packed with hot new features that make it more powerful, yet easier to use, for all your publications. We've listened to our users, now PagePlus 2.0 can do just about anything you want – and then some. Check out this ad – *it's designed and produced using PagePlus 2.0 with full color separated output.* Now it's so easy for everyone to look good in print, and with our 60-day Money-Back Guarantee you've nothing to lose.

60 DAY MONEY BACK GUARANTEE

NEW! **Full Color Publishing** including image colorize, Pantone® Color License and Full Process Color Separations. A major industry first!

NEW! **Text Frames** with unique column blinds give you the ultimate in text flow control.

NEW! **Styles and Templates** with AutoApply for great looking pages in a hurry.

	Serif PagePlus 2.0	Aldus PagePublisher 5.0	Microsoft Publisher 1.0
Auto Text Flow	○	○	○
Kerning	○	○	○
Import Pictures	○	○	○
Drawing Tools	○	○	○
Rulers, Guides	○	○	○
Multiple Zoom Levels	○	○	○
Publishing Templates	○	○	○
Irregular Text Wrap	○	○	
Styles	○	○	
Pantone® Colors	○	○	
Process Color Seps.	○	○	
Free Rotation	○	○	
Free & Frame Text	○		
Export as Picture	○		
ChangeBar	○		

NEW! **Export as Picture** from PagePlus 2.0 to jazz up your WP document or spreadsheet.

NEW! **Free Text** lets you drag and drop text anywhere on the page or pasteboard.

NEW! **Free Rotation** of text and graphics. Wow!

NEW! **ChangeBar** technology for dynamic on-screen changes. It couldn't be easier.

NEW! **Even More Goodies** like movable rulers, hint line, CleanUp, Status Editor, OLE, TrueType...

It's a Winner!

PagePlus 1.2 is the Winner of the Windows User Award for "Best desktop publishing software" – the losers included MS Publisher, Aldus PageMaker and Ventura Publisher. Now, the best just got better – PagePlus 2.0 keeps Serif out in front. It's a Winner!

New Publishing Packs...

To add extra variety, we've introduced three great new Publishing Packs. At just **$19.95** they're the lowest priced Windows add-ons. *For all your applications – not just PagePlus!*

NEW! **TypePlus 2.0** for eye-catching text effects. Type on an arc, circle, button or bezier curve.

NEW! **ArtPack** a professionally drawn collection of over 500 color images for superb results.

NEW! **FontPack** over 100 (yes, 100) TrueType classic and decorative typefaces!

Now try PagePlus 2.0 for just $59.95 in our Special Offer!

We're launching PagePlus 2.0 at just **$59.95** and our Publishing Packs at only **$19.95** each. It's only possible because you're buying Direct from the publisher – Serif gives you high-end products at entry-level prices. Better still, get everything in our BumperPack for **$99.95** and save another $20. (For education and larger groups you can get the BumperPack for *10 Users* for $249). Order now and find out for yourself why PagePlus 2.0 really is the Next Generation Publisher.

So call us Direct, or fax/mail the coupon today!

24-HOUR TOLL-FREE HOTLINE
800-697-3743

24-HOUR FAX ORDER LINE
800-869-8909

Great Software, Direct

- An Award-Winning Product, and already a Best Seller with over 50,000 enthusiastic users
- The Best Value *and* Lowest Price - why pay more?
- FREE Product Support and Low-Cost Upgrades
- A 60-Day, No-Quibble, Money-Back Guarantee
- Great software, Direct from the publisher

YES! Please rush me...

- ☐ **PagePlus 2.0 @ $59.95**
- ☐ **TypePlus 2.0 @ $19.95**
- ☐ **ArtPack @ $19.95**
- ☐ **FontPack @ $19.95**
- ☐ **BumperPack @ $99.95**
- ☐ **10-User Pack @ $249**

I enclose a total* of $ .....

*Add $7 for S&H ($12 International).

Credit Card No. .....
Exp. Date .....
Signature .....
Name .....
Company .....
Address .....
City .....
State ..... Zip .....
Telephone (.....) .....

Please return to:
Serif, Inc.
PO Box 803
Nashua NH 03061
Or Fax Toll-Free to: 800-869-8909

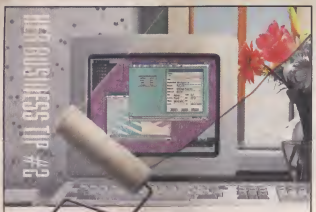
PCC11

SERIF

Serif, Inc. • PO Box 803 Nashua NH 03061 • Tel: (603) 880-8650 Fax: (603) 889-1127
Serif Europe • PO Box 15 Nottingham NG7 2DA England • Tel: +44 602 421502 Fax: +44 602 701022
NOTE: Please add $7 S&H ($12 international). Checks and Money Orders to SERIF, VISA, MasterCard, and American Express. Official POs from Education, Government and Fortune 1000. BumperPack is PagePlus and all Publishing Packs. 10-User Pack is BumperPack with Site License for 10 users in one location. You need Windows 3.1 or higher. All Serif product names are trademarks of Serif, Inc. All other trademarks acknowledged. **Like all Serif marketing materials, this ad was designed and color separated using PagePlus.**

DESKTOP PUBLISHING

CIRCLE 402 ON READER SERVICE CARD



PLUG A NEW FACE ON YOUR HOST DATA...

KEAterm VT EMULATION GIVES YOUR HOST DATA A FACELIFT—THE WINDOWS WAY!

Green screen, host data was dull, colorless, and limited by aging host applications. KEAterm transforms your host data—making it better looking, and more useable.

Apply the power and ease of Windows tools, like Excel, 1-2-3, WordPerfect, Visual Basic ... to your host data using KEAterm's DDE, hot links, file transfer, and user-defined menus and dialog boxes. And you'll get more done faster with multiple KEAterm sessions.

Advanced features include a powerful macro language and definable on-screen button pads, to make your work even easier. KEAterm speeds your work with high throughput over your serial port or installed TCP/IP or LAT network. ■

KEAterm 420—a powerful link to your VAX and UNIX host applications

KEAterm 340—for applications requiring 8x6GB, 7x480mode, or ansi graphics

KEAterm—for **Windows NT** available soon!

Empowers your desktop now!

Call 1-800-663-8702

KEA Systems Ltd.
2720 North Fraser Way (Unit 10)
Burnaby, B.C. Canada V5J 5G3
Phone (604) 431-1777
Fax: (604) 431-0818

KEA

©1994, KEAterm 2010, PowerSteer, KEA and their respective logos are trademarks of KEA Systems Ltd. All other brand or product names are trademarks or registered trademarks of their respective holders. Copyright KEA SYSTEMS LTD 1993. All rights reserved.

CIRCLE 403 ON READER SERVICE CARD

It may be great for MTV, but if you're running Windows 3.1 without **PLUG-IN FOR PROGRAM MANAGER™**, you're minimizing productivity. Does your system provide:

- Personalized group icon assignment
  —"Jerry Pournelle's Windows Utility..."
- Fully configurable QuickRun menu
  —Jerry Pournelle, BYTE magazine, Spring '93
- Nested groups with complete group management
  —a $20 shareware gem from Planner Crafters
- System resource & memory monitor with alerts
  —PC Magazine, Jan. '94
- Title bar clock with reminder alarms
  —"No Windows system power program manager"
- Custom cursor selection
  —PC Computing, Jan. '94

With Planner Crafters' **PLUG-IN FOR PROGRAM MANAGER™** it can have all this and more. Of course you could spend over $100 for a desktop replacement but **PLUG-IN** brings you the increased productivity and flexibility for only $20. So stop working with your system unplugged. Order your copy today.

PLANNER CRAFTERS, INC.
2380 Rynic Way
Alpharetta, GA 30202-5078
800-651-1000 orders only
404-740-9821 inforfax support
404-740-1914 fax
73040,334 CompuServe

In the U.S. and Canada - $22 (includes $2 shipping and handling)
Everywhere else on the planet - $25 (includes $5 shipping and handling)
30 day money back guarantee

CIRCLE 405 ON READER SERVICE CARD

GRAPHICS–NETWORKING–UTILITIES–HARDWARE/BOARDS

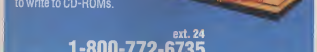
COREL SCSI Pro!

The Best Software to Maximize SCSI Performance

The easy way!

CorelSCSI Pro has all the features provided with CorelSCSI, including: support for any ASPI-compatible host adapter, a smart installation, diagnostic tests, and a backup utility. CorelSCSI Pro also includes support for TWAIN-compliant SCSI scanners, a high-performance CD-ROM server application and the ablity to write to CD-ROMs.

ext. 24
1-800-772-6735



CIRCLE 404 ON READER SERVICE CARD

VESA Upgrades

Upgrade your present PC to the power of 32 bit Local Bus Performance. We supply easy, step-by-step info on how to install a new mother boards, video cards, and hard drive controllers. Plus we offer toll free tech support and a full refund satisfaction guarantee. Check these values, or call, or fax for more information on boards, drives, or systems.

486/33DX VESA w/64k CACHE and Cirrus Logic 32 bit VGA	$529
486DX2/50VESA 256K CACHE w/ 32 bit Cirrus Logic VGA	$699
486DX2/66 VESA 128K Cache with Cirrus Logic VGA	$799
Cirrus Logic VESA VGA video board	$99
ISA and EISA systems and boards and components	*Call*

Dial 317 849 8683 to get Instant Tech Info FREE from your Fax! You can obtain specs and info on these products and more by dialing our Fax Facts automated service. Call our number from your fax, request the document as listed above. Start your fax, and the document will begin printing on your fax!

VISA *Order Toll Free 24 Hours a Day!* MasterCard
Dial 1-800-445-7717

Fax in your order Toll Free, 1-800-448-1084 Use 800 numbers in all 50 states, plus Canada. Fax 317-849-8794. Use our BBS for information by dialing 317-579-2045

ACE COMM. 10707 East 106th Street, Fishers, IN 46038

CIRCLE 406 ON READER SERVICE CARD

The Power Of CD-ROM

CD-ROM Titles

US Atlas & AutoMap Color maps of the US and detail road maps	$29.00
Business Backgrounds Clip art of business equipment, offices, buildings	$29.00
Scenic and Architecture Unique variety of copyright-free color photos	$49.00
information U.S.A. 9,000 Sources of money, help and information	$99.00
Career Opportunities Info on jobs, requirements, salaries	$36.00
Compton's Multimedia Encyclopedia 32,000 articles, 13,000 pictures, sound, animation	$349.00
Guinness Disc of Records 7,000 world records, 300 color photos, 70 sounds	$43.00
Compton's Family Choice 15 best selling educational titles on one disc	$36.00
Book Of Lists Trivia, 30 min. of audio & 100 images	$64.00
U.S. Presidents Major events, personal data on each U.S. president	$49.00
U.S.A. Wars - Desert Storm Facts on U.S. forces, coalition command game	$36.00
KGB/CIA World Fact Book Statistics for over 250 countries world-wide	$36.00
Compton's Multimedia Golf Guide California/Hawaii edition	$43.00
The Grammy Awards Data, photos & sound of past 34 ceremonies	$43.00
Software Jukebox Games, links, faces, jet fighters & 50 demos	$43.00
Chessmaster 3000 Many levels, visual & sound animation of moves	$26.00
CD Cleaning Kit	$9.99
Laser Lens Cleaner	$29.99

We Have A Full Line Of Titles Available

Protect Your CD-ROM Investment

MADE IN USA

CD-ROM Caddies

Every CD-ROM disc you have should be safeguarded in its own caddy to eliminate fingerprints, dust and scratches due to excessive handling. Required usage with most industry standard disc drives. Official licensed product, Made in the U.S.A.

$7.99 Volume discounts available

Disc Storage Box
Stackable, holds 12 CD-ROMs in caddies for display horizontally or vertically. **$6.99**

Discube™
Holds 10 CD-ROMs in caddies or jewel boxes. Patented spring action allows fast access to CD-ROMs. Easily stackable. **$14.99**

CD-ROM Carousel File
Sturdy rotary file holds 60 CD-ROMs in caddies or jewel boxes. Rotates on a quiet swivel base. **$64.99**

Add-On File
Easily bolts on top of the swiveling unit to provide storage for another 60 caddies. **$55.99**

Internal CD-ROM Drives

QB-522
AT-BUS Interface, 380 MS Access Time, 64 K Byte Buffer, 150 K Byte Transfer Rate. **$289.00**

QB-532
SCSI Interface, 290 MS Access Time, 128 K Buffer, 153 K Byte Transfer Rate. **$399.00**

Combine Drives, Titles, Caddies & Storage to customize your own CD-ROM Drive Bundle! Call Us For Details.

Portable Power

3.5" 128 MB Rewritable Optical Disc
High storage quality, superior durability from Idemitsu **$37.99**

OptiByte® Mobile Expansion System For Compaq LTE
Built-in CD-ROM drive, SCSI interface, stereo speakers. 128MB rewritable drive available. Call for pricing.

DB Products 1-800-323-6856 Fax: 708-487-2689
1260 Karl Court, Wauconda, IL 60084

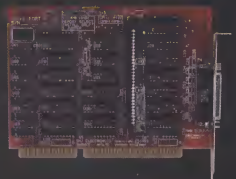
VISA MasterCard

Reseller Programs Available

PCC 11-93

Cache Port

HIGH SPEED CACHING PARALLEL PRINTER PORT



The Fastest Way To Print On Your P.C.
NO DRIVERS • NO SOFTWARE
NO CONFIGURATION

SMJ ELECTRONICS, INC.

800) 356-7678
FAX (800) 356-7698
2910 Clayton Road, B-230
Concord, CA 945 9

VISA

CIRCLE 409 ON READER SERVICE CARD

Memory, Hard Drives, Components?

1MB SIMM 70ns

$35.90

W.D. Caviar IDE

250MB ~~$238~~ EVEN LESS!

340MB ~~$288~~ EVEN LESS!

3 YEAR WARRANTY

CALL FOR THE LOWEST PRICE

COLORADO JUMBO TAPE BACK UP 250 MB ~~$178~~ EVEN LESS!

C.O.D. NO PROBLEM!

Personal & Company Checks Welcome!

MOTHERBOARDS PERFECT FOR UPGRADES!

386SX40 AMD CPU! ~~$96~~ EVEN LESS!

386DX40 ~~$139~~ EVEN LESS!
Upgradable to 486!
AMI BIOS, 128K CACHE

486DX33 ~~$438~~ EVEN LESS!
GENUINE INTEL CPU
256K CACHE!
Pentium upgradable 3 VESA Local Slots

- $72 386DX40 COPRO
- $59 MINI-TOWER CASE w/200W P.S.
- $66 Trident SVGA 1MB FAST 1280x1024!
- $47 1.44 TEAC FLOPPY
- $57 1.2 TEAC FLOPPY
- $19 IDE I/O w/CABLES 2 HD., 2 FLOPPYS 2 Serial Port, 1 Game

INIS, Inc. 206-633-0706 Vi, MC & Discover
Prices Subject to Change without notice NO SURCHARGES! **800-239-2540**

COMPONENTS? FREE CATALOG

CIRCLE 410 ON READER SERVICE CARD

PREMIER

BOARDS/COMPONENTS/CHIPS

IT DUPLICATES EVERYTHING EXCEPT YOUR EFFORTS.

With dimensions of 10"x36"x16", the Tracer/ST is no bigger than a typical laser printer.

Announcing the most effortless way to copy diskettes. The Tracer/ST—the affordable desktop system that formats, duplicates, and verifies hundreds of diskettes per hour. Automatically.

Better yet, the Tracer/ST family grows with you.

Expansion options can double output, support a network, or simplify storage with an internal hard disk.

So call 800-872-2318 for the duplication system that can't be duplicated anywhere.

©1993 Trace. All trademarks are property of their respective holders. Fax us at 408-441-3288 or write to Trace, Dept. B., 1040 E. Brokaw Road, San Jose, CA, 95131

Trace

CIRCLE 408 ON READER SERVICE CARD

Is the pressure on to justify how you spend your training dollars?

In these days of tight budgets, you need solid proof of the value of training.

That's why Logical Operations has developed the Skills Evaluation Series™: software-skills tests that you can use to assess basic software skills, screen to determine training requirements, and measure training effectiveness.

Each Skills Evaluation contains 20 multiple-choice questions with a manually or automatically scored answer card. Most evaluations are "hands-on," where students must be using the actual software and the sample files provided in order to complete the evaluation.

Fully validated, and designed to work with Logical Operations' classroom training materials (if you use them!), Skills Evaluations are available for most major software applications including, **Word for Windows, WordPerfect 5.1, Macintosh Orientation System 7, PC Literacy, 1-2-3 Release 3.1, Windows 3.1 Orientation, and Excel 3.0 for Windows.**

At only $78 for a Skills Evaluation Starter Package, you'll get an information-packed Administrator's Guide, answer key, and a 10 pack of tests. Additional 10 packs are available for $50.

Skills Evaluation Series™

Order now — it might prove to be the most cost-effective thing you'll do today. **Call 1-800-456-4677, ext. 40 to receive a FREE evaluation,** and prove the value of your training today.

Logical Operations

Learn from us.

The Skills Evaluation Series logo is a registered trademark of Logical Operations. All other copyrights are trademarks or registered trademarks of their respective owners.

AmRam

408-559-0603
FAX 408-559-0301

1MB SIMM 80ns $39 | 4MB SIMM 80ns $139

TYPE	PKG.	100ns	80ns	60ns
256K x 4	DIP	$4.95	$5.25	$5.35
1M x 1	DIP	$6.99	$5.99	$5.99
256K x 9	SIMM	$8.99	$10.50	$12.99
		80ns	70ns	60ns
1M x 9 3 chip	SIMM	$39.00	$41.00	$43.00
1M x 9 9 chip	SIMM	$41.00	$43.00	$45.00
4M x 9 9 chip	SIMM	$139.00	$149.00	$159.00
1M x 36 72 pin SIMM.			$179.00	

MATH CO-PROCESSORS/CPUs

80387-SX	16-25	INTEL	$74.95
80387-DX	16-33	INTEL	$79.95
83SX87	16-25	CYRIX	$56.47
83DX87	16-33	CYRIX	$63.52
83087-40		CYRIX	$73.00
00P486-0X2	66MHZ	INTEL	$562.00
00P486-0X2	50MHZ	INTEL	$444.00

CACHE MEMORY ALSO IN STOCK!

Discover the Power of LASERVOICE 2000

Commercial Quality to insure the best personal image for your company!
LaserVoice is feature rich and includes the following options:

- *Auto Attendant*
- *Voice Messaging*
- *Audiotext*
- *Supports 2-64 Lines*
- *Classified Ad Listing*
- *Fax Request Services*
- *Outbound Dialing*
- *and More.*

IBM PC/XT, AT 286, 386 Compatible

Prices starting as low as $1195

CALL TODAY!
Orders: (216) 253-5945
24 Hour Demo Line: (216) 253-5945

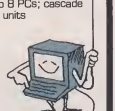
AMERIFAX 572 W. Market Street.,#5 • Akron, Ohio 44303

CIRCLE 411 ON READER SERVICE CARD

COMMANDER

CONTROL UP TO 96 PC FILE SERVERS WITH 1 KEYBOARD, MONITOR, AND MOUSE

- Select via Keyboard
- Dual access to 150 feet away (optional)
- "AutoBoot™" Feature boots attached computers without operator intervention
- Use either PS/2 or Microsoft serial mouse with available cables
- Each unit accommodates from 2 to 8 PCs; cascade up to 12 units



CYBEX

4912 Research Drive • Huntsville, AL 35805 U.S.A.
(205) 430-4000 • FAX (205) 430-4030

CIRCLE 413 ON READER SERVICE CARD

PC-COMPANION PLUS™

Add a second Keyboard, Monitor and Mouse up to 250 feet from your PC!

- PC/AT, PS/2 and 100% Compatibles
- Supports VGA up to 1024 x 768
- Use either PS/2 or Serial Mice
- Combine monochrome and color VGA

Made in USA

Dealer Program Available

CYBEX

4912 Research Drive • Huntsville, AL 35805 U.S.A.
(205) 430-4000 • FAX (205) 430-4030

CIRCLE 412 ON READER SERVICE CARD

STOP COPYING FAXES!

PLAIN PAPER FAX
From Your Printer
with *FaxPak*

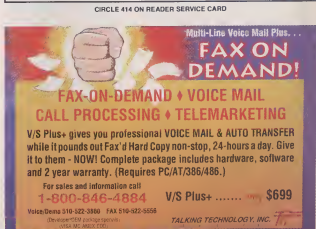
- No Computer Required
- Connects to Serial or Parallel Printer Port
- Connects to PC or Net Server to Share Printer
- Receives and Stores Faxes if Printer is Busy or Off
- Built-In Auto Switch to Share Phone Line with Telephone, Fax, and Answering Machine
- For Laser, Inkjet and Dot Matrix Printers
- 2 Year Warranty. 30 Day Money Back Guarantee.

$249
* Reg. $299

Teledisk Systems, Inc.
2401 Marinship Way Sausalito, CA 94965

Orders: 1-800-669-3700
SEE US AT BOOTH #218 AT PC EXPO

CIRCLE 414 ON READER SERVICE CARD



PREMIER COMPUTER SYSTEMS

GUARANTEED LOWEST PRICES
ON EVERY HARDRIVE

Seagate

MODEL	SIZE	SPEED	TYPE	PRICE
ST225	20MB	65MS	MFM 5.25"	$169
ST251 1	42MB	28MS	MFM 5 25"	$249
ST351A (1" high)	42MB	28MS	IDE 3 5"	$125
ST3144A (1" high)	130MB	16MS	IDE 3 5"	$208
ST3243A	213MB	15MS	IDE 3 5"	$249
ST3283N	249MB	12MS	SCSI 2	$399
ST3290A ... 260MB	**15MS**		**IDE 3.5"**	**$274**
ST3390N	343MB	12MS	SCSI 2	$479
ST3550A	452MB	12MS	IDE 3 5"	$489
ST3550N	457MB	12MS	SCSI 2	$598
ST3655A	545MB	12MS	IDE 3 5"	$698
ST4096	80MB	28MB	MFM Full HT	$389
ST4144R	125MB	65MS	RLL (FULL HT)	$399
ST9096A	85MB	16MS	IDE 2 5"	$298
ST9144A	128MB	16MS	IDE 2 5"	$348

CONNER

MODEL	SIZE	SPEED	TYPE	PRICE
CP30084	80MB	17MS	IDE	$175
CP30104 (1" high)	120MB	19MS	IDE	$189
CP30174A (1" high)	170MB	17MS	IDE	$208
CP30254 (1" high)	209MB	12MS	IDE	$278
CP30540	540MB	10MS	SCSI	$698
CP30544A	540MB	15MS	IDE	$698

Maxtor 2 YEAR WARRANTY

MODEL	SIZE	SPEED	TYPE	PRICE
7131A (1" high)	130MB	15MS	IDE	$198
7213A (1" high)	213MB	15MS	IDE	$234
7213S (1" high)	213MB	15MS	SCSI	$275
7245A (1" high)	245MB	15MS	IDE	$269
7345A (1" high)	345MB	15MS	IDE	$339
MXT540SL	540MB	13MS	SCSI/IDE	$849
PANTHER (FH) P012S	1000MB	13MS	SCSI	$998
PANTHER (FH) P117 ..... 1500MB		**13MS**	**SCSI**	**$1258**

FUJITSU 5 YEAR WARRANTY

MODEL	SIZE	SPEED	TYPE	COST
2622A/S (3 5")	330MB	12MS	SCSI/IDE	$565
2623A/S (3 5")	420MB	12MS	SCSI/IDE	$738
2624A/S (3 5")	520MB	12MS	SCSI/IDE	$725
2266S (FH)	1080MB	15MS	SCSI	$999
2652S (FH)	1750MB	11MS	SCSI	$1888
2654S (FH)	2060MB	12MS	SCSI	$1998

MICROPOLIS reduced pricing!

2105 (3 5)	560MB	10MS	SCSI/IDE	$869
1624 (HH)	660MB	15MS	SCSI	$795
2112 (3.5")	1050MB	10MS	SCSI/IDE	$1069
1528-15 (FH)	1350MB	14MS	SCSI	$1098
1548 (FH)	1748 MB	14MS	SCSI	$1595
1924 (FH)	2100MB	11MS	SCSI	$2279
1936 (FH)	3300MB	11MS	SCSI	$2895

WESTERN DIGITAL 2 YEAR WARRANTY

2200 (1"high)	212MB	13MS	3 5" IDE	$235
2250 (1"high)	256MB	12MS	3 5" IDE	$275
2340 (1"high)	340MB	12MS	3 5" IDE	$339
2420 (1" high)	425MB	12MS	3 5" IDE	$498

intel Classic Memory Board

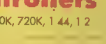
For 286 and 386 sytems ASCI design gives EMS support in hardware for up to 90X performance over software EMS Up to 8MB using 1MB SIMMS Works in both 8 ir 16 bit exponsion slots

2MEG-$198 4MEG-$308 8MEG-$538

PRICES REDUCED Floppy Drives

360K	5 25"	1/2 HT	$29
720K	3 5"	1/2 HT	$34
1 2MB	5 25"	1/2 HT	$58
1 44MB	3 5"	1/2 HT	$47
5 25"	MOUNTING FOR 3 5" DRIVES		$5

1 44/1 2 DRIVE $139



1 YEAR WARRANTY

Drive Controllers

8 Bit	4 Floppy High Density 360K, 720K, 1 44, 1 2	$49
8 Bit	2 Hard Drives MFM	$49
8 Bit	2 Hard Drives RLL	$69
16 Bit	Hard Drive only MFM Western Digital	$29
16 Bit	Hard and Floppy 1 1 Interleave	$34
SCSI	DTC 3280 (Supports 7 drives)	$139
SCSI	Adaptec 1742A 32 BIT	$418
SCSI	Adaptec 1542 Bus Mastering	$219
ESDI	DTC6282-24	$149
IDE	Hard and Floppy	$19
IO8	**Hard and Floppy w/IO**	**$29**
Cables	Hard Drive	$9
Cables	Hard and Floppy	$14
SCSI 2	ULTRA14F, ISA	$149
SCSI-2	ULTRA14E, ISA BUSMASTER	$238
SCSI-2	ULTRA34F, VESA LB	$299
IDE	ULTRA15C, W/CACHE 0-8MB	$198
IDE VL	HARD & FLOPPY (VLB)	$69

WORDSTAR®

ONLY 500 COPIES LEFT!

Wordstar 2000 Rel. 3.5

This is not a misprint! These are the exact same ones selling for over $300 00 from our competitors We have hundreds in stock ro sale below dealer cost! Retail boxed and factory sealed

$99 RETAIL $495.00

TOLL FREE
800-982-2946

For U.S. and Canadian Orders only

HOURS: M-F 7AM-6PM / SAT 10AM-3PM PST

TECHNICAL & CUSTOMER SERVICE CALL:

(702) 294-0204

PURCHASE ORDERS & INTERNATIONAL ORDERS

FAX TO: (702) 294-1168

WE BUY EXCESS INVENTORY

NEVADA COMPUTER

Memory Shortage?

As of 9/3/93 these are our prices. We are trying to maintain them for as long as possible. Due to a July 4 fire at an epoxy plant in Japan and an ever growing demand for memory, there is a worldwide shortage of memory. We are getting thousands of pieces per day and are offering all memory to our current customers at the lowest cost possible for the next several months. This is the prepaid price.

PRICES COULD HAVE FALLEN... CALL (800) 982-2946 FOR CURRENT PRICES

PACKARD BELL COMPUTER LIQUIDATION

8088 CPU, 101 KEYBOARD, 360K FLOPPY, 640K RAM, DESKTOP CASE W/ POWER SUPPLY, SERIAL & PARALLEL PORTS CGA CARD & COLOR MONITOR **$198**

MODEM SALE

All modems come complete with software, cable, manuals and a one year warranty They are auto answer auto dial, Hayes compatible with error correction

1200 Baud PC Internal	$9 (External $29)
1200 Baud PS2 Internal	$14
2400 Baud PC Internal	$34 (External $59)
2400 Baud Pocket External	$99
2400 Laptop as low as	$99

FAX MODEMS

9600/2400 for PC and PS1 / WinFax or BitFax software	$48
9600/2400 Laptops & Notebooks	$199
1 44 BPS For PC and PS1	$159
PCMCIA 2 0 9600/2400	$249

UPGRADE YOUR 386 TO A 486

	486DLC 40	486DX 33	486DLC 33	486SX-25	386DX 33
PC Mag 6 0 Avg Mix	1470	1339	1215	1002	857
Landmark V2.0	130	111 5	107 2	83 6	51 5
Norton SI 6.0	65.6	70 9	54 1	52 7	47 7

386DX Upgrade
80486DLC 25 $118
80486DLC 33 $159
80486DLC 40 $199

386SX Upgrade
80486SLC-25 $128
80486SLC-33 $199

Clock Doublers
486DRX2-16/32 $295
486DRX2-20/40 $339

- Up to 70% Faster
- 5 Year Warranty
- Dos Compatible
- 1K Internal Cache W/ Hit Rate of 85%
- Plug Compatible
- 486 Instruction set
- Windows Compatible
- Cache Software]
- Compatible w/ 386 Coprocessor

Cyrix TEXAS INSTRUMENTS

COPROCESSORS

8088 BASED MACHINES.
8087 3 5MHz $48
8087 2 8MHz $68
8087 1 10MHz $88

80286 BASED MACHINES.
80287 6MHz $29
80287 8MHz $39
80287 10MHz $49
80287 XL $58
80287 XL1 $99

80386 BASED MACHINES.
80387 16MHz $49
80387 20MHz $59
80387 25MHz $69
80387 33MHz $79
80387-SX16 $58
80387 SX20 $79
80387 SX33 $84
80387SL $88

intel 486DX/SX CPU'S

80486 DX/25	$284
80486 DX/33	$309
80486 DX/50	$478
80486 DX-2/50	$399
80486 DX-2/66	$538
80486 SX/25	$119
80486 SX/33	$198
CPU COOLING	$24

intel OVERDRIVES

Boosts overall system performance up to 70% by doubling the internal operating speed of your present microprocessor.

486DX2-66	$598
486DX2-50	$498
486SX25	$499

Cyrix

83D87 33MHZ	$79
83D87 40MHZ	$84
83S87 25MHZ (SX)	$79
83S87-33MHZ (SX)	$84

Call us with your best quote!

IBM PS/2 Memory

MODEL	MEMORY	PART#	PRICE
PS/1 and 386/SX (2121)	2MB	92F9935	$118
	4MB	92F9694	$218
PS/2 30/286,25/286, Adpt Brd 1497259	512K	30F5348	$39
	2MB	30F5360	$114
PS/2 35SX, LS, 40SX,70-E61, 061, 121 Adpt Brd 6450609, 34F3011, 34F3077, 502 55SX, 655SX P70, 55LS, 65LS XStation 120 & 130	1MB	6450603	$57
	2MB	6450604	$104
PS2 50, 50Z, 55SX, 60, 65SX	2-8MB	1497259	$317
	2-16MB	6450609	$368
2-8 MB FDR PS/2 50 & 60, 2MB $159, 4MB $259, 8MB $489			
PS/1 Consultant, Essentials & Expert models x43, x44 & PS/Valuepoint all models except Cxx series	4MB	N/A	$238
	16MB	N/A	$844
PS/2 70-A21, A61, B21, 861, PS/1 Consultant Essential & Expert models x11, x13 & x14, PS/Valuepoint Cxx series	1MB	6450603	$49
	2MB	6450608	$99
PS/2 35SX, LS, 40SX, 55SX, LS, 65SX,	4MB	34F2933	$218
PS/2 90 XP, 95 XP, P75 (Pairs), 56 57 (all) 76 77 PS/1 Pro 2123	2MB	6450902	$107
PS2 90 95 XP, P75 (Pairs) 56, 57, (all) PS/1 Consultant, Essential, Expert x11, x13 & x14 PS/1 Pro 2123, RS/6000	4MB	6450128	$218
	8MB	6450130	$468
PS2/2 35SX LS, 40SX	8MB	6450129	$468
PS2 70's and 80's	2-8MB	6450605	$297
32 BIT BOARDS	2-14MB	34F3077	$388
32 BIT BOARDS	4-16MB	34F3011	$448
PS/2 80-A21, A31, A61	4MB	6451060	$198
PS/2 80 041	1MB	6450375	$88
PS/2 80-111, 311 121, 321, 081, 161	2MB	6450379	$108
ValuePoint 425SX/25/DX33 & 66	1MB	96F9290	$58
	4MB	96F9291	$268

BOCARAM/2 PLUS

For PS/2 16 Bit Memory for IBM MCA, DOS and OS2 LIM EMS 2 to 8MB (uses 1MEG SIMMS) 2MB $239 4MB-$345 8MB-$572

IBM Laptop Memory

Thinkpad 300	2MB	33G9288	$119
	8MB	33G9289	$499
Thinkpad 700T	2MB	53G6958	$138
	4MB	53G6959	$298
	8MB	53G6960	$499
CL57SX	2MB	07G1419	$168
Thinkpad 700, 700C, 720, 720C	4MB	07G1420	$259
	8MB	07G1421	$489
PS/Note N45	2MB	92F8804	$108
PS/2 Model N51, Notebook SLC, SX	2MB	07G1826	$108
	4MB	07G1827	$268
	8MB	07G1828	$448
Laptop N33SX, L40SX & PSNOTE 182	2MB	79F0999	$108
	4MB	79F1000	$268
L40SX, PSNOTE 182 ONLY	8MB	79F1001	$488

In Touch with Tomorrow TOSHIBA Laptop & Notebook Memory

MODEL	MEMORY	PART#	PRICE
T1000 SE/LE/XE	2MB	PA8312U	$104
T2000 / T2000SX	2MB	PA8317U	$104
T2000SX/T1000 LE	4MB	PA8314U	$238
	8MB	PA8315U	$447
T1200 XE	2MB	PA8306U	$112
T1600	2MB	PA8302U	$105
T2000 SXE/T2200SX/T1800 T1850, C	2MB	PA2000U	$109
	4MB	PA2001U	$239
	8MB	PA2002U	$447
T3100	2MB	PA7135E	$178
T3100 E	2MB	PA8341U	$108
T3100 SX	2MB	PA8308U	$108
	4MB	PA8310U	$234
T3200 SX	2MB	PA8307U	$108
	4MB	PA8309U	$214
T3200 SXC	2MB	PA8318U	$108
	4MB	PA8319U	$214
T3200	3MB	PA7137U	$186
T3300SL	2MB	PA2006U	$118
	4MB	PA2007U	$238
	6MB	PA2008U	$278
	16MB	PA2009U	$998
T4400 SX, SXC, T6400 SXC, DXC	2MB	PA2003U	$125
	4MB	PA2004U	$238
	8MB	PA2005U	$448
	16MB	PA2010U	$989
	32MB		$1999
T4500, T4600, T1900C 3 3VOLTS	4MB	PA2012U	$288
	8MB	PA2013U	$478
	16MB	PA2014U	$1298
T5100	2MB	PA8301U	$104
T5200/T5200C/T8500	2MB	PA8304U	$109
	8MB	PA8313U	$448

COMPAQ Memory

MODEL	MEMORY	PART#	PRICE
Deskpro 386/16	1 2MB	108069-001	$338
	2MB	108069W71	$448
	4-8MB	108070-001	$498
Deskpro 286E, 386-20, 20E, 25, 25E	1MB	113131-001	$59
	4MB	113132-001	$238
Deskpro 386S	4MB Board	113634 001	$219
	4MB Module	112534-001	$259
Deskpro 386 20E, 25E	4MB	113645-001	$299
Deskpro 386/33, 386/33l, 486/25, 33L,50L, Systempro	2MB	115144-001	$124
	8MB	116561 001	$449
	32MB	116568-001	$1999
Systempro, Deskpro 6 SKT EXP BRD W/2MB		116569 001	$399
Compaq "M"	2-64MB	129160-001	$448
Deskpro 286N, 386N, 386SX/20, 20N, Portable 486c, Deskpro M, Systempro LT Series 129160-001, Compaq Pro Signia	1MB	118688-001	$49
	2MB	118689 001	$105
	4MB	118690 001	$238
	8MB	128877-001	$444
Prolina 3/25 & 25Z	2MB	141738-001	$109
	8MB	141742-001	$399
Prolina 4/25si, 4/33, 4/50	2MB Module	141683 001	$108
	4MB Module	141684-001	$238
	8MB Module	141685-001	$418
Compaq Pro Signia	16MB	149320-001	$995
	32MB	149147-001	$2395

COMPAQ Laptop & Notebook Memory

Contura 320, 325	2MB	139497-001	$108
	4MB	139498-001	$238
	8MB	139499-001	$418
Contura 4/25CX	4MB	146520-001	$228
	8MB	146521-001	$471
	16MB	146532-001	$948
SLT/286	1MB	110235-001	$79
	4MB	110237-001	$208
SLT386	1MB	118303 001	$79
	2MB	118304-001	$108
	4MB	118305-001	$238
Lte 286	1MB	117081-001	$79
	2MB	117081-002	$109
	4MB	117081-004	$238
Lte 386S/20	1MB	121125 001	$98
	4MB	121125-002	$218
Lte Lite/20, 25, 25C	2MB	129769-001	$138
	4MB	129769-002	$248
	8MB	129769-003	$421
	16MB	129769-004	$1395
LTE Lite/20 & Lite/25,25C	16MB	N/A	$1045
LTE Lite 486/25C	4MB	142337-002	$239
	8MB	142337-003	$478
	16MB	142337-004	$1198

Simm Modules

Prices change up and down call Sipp modules, add $3 00 ea.

DESCRIPTION	100NS	80NS	70NS	60NS	53NS	40NS
256X9	$7	$12	$15	$17		
1MEGX3		$55	$56	$61		
1MEG X 9	$44	$57	$60	$64	$69	$78
4MEG X 9		$168	$178	$188		
16MEG X 9 (36 CHIP)			$999			
256X36 1MEG (72 Pin)		$69				
512X36 2MEG (72 Pin)		$114	$124	$129		
1X36 4MEG (72 Pin)		$208	$218	$288		
2X36 8MEG (72 Pin)		$418	$447	$478		
4X36 16MEG (72 Pin)		$748	$798	$848		
8X36 32MEG (72 PIN)			$2150			

D-Ram Chips

DESCRIPTION	150NS	120NS	100NS	80NS	70NS	60NS
64 X 4	$1 95	$2 25	$2 45	$2 95		
256X1 STATIC				$1 95	$2 25	
256 X 1	$1 45	$1 85	$2 40	$3.00	$3 15	$3 20
256 X 4			$5 45	$6 95	$7 45	$7 95
1MEG X 1		$2 95	$4 50	$5 75	$6 45	$6 75
1MEGX1 STATIC				$4 95	$5 25	
1MEGX4				$22 00	$25 00	$29 00

CACHE MEMORY

	15ns	20ns	25ns
8KX8	5 95	5 45	4 95
32X8	9 95	8 75	
64x1	10 95	9 45	8 95
64x4	11 95	9 95	8 95
16x4	9 95	6 45	5 95
128x8		60 00	50 00

PCMCIA 2.0 SRAM MEMORY

AST POWEREXEC DEC PALMTOP, DELL 320SL GRID GRIDPAD HP 95LX IBM PC RADIO MOMENTA PENTOP, NCR 3125 NOTEPAD, POQET SHARP PC3000/3100, SHARP PC-6700/6741/6781/6785, SHARP PC-6800/6841/6881/6891 ZEOS POCKET PC

512K $98.00 1MB $148.00 2MB $284.00

Laser Printer Memory

MODULE	1MEG	2MEG	3MEG	4MEG	5MEG	8MEG
Brother HL-10V/DV		$165		$264		
Canon LBP4, 4 Lite & 4+	$118	$184				
Compaq Pagemark 15 & 20				$289		$420
Epson Action Laser II, 8000	$95		$163		$229	
Epson + 6000 and many more		$98		$168		
Epson Actionlaser 1000 & 1500		$138		$276		$399
Fujitsu 7100 & 7200	$199	$279				
HP Deskjet 500, 500C and 550C		$59 (256K)				
HP2, 2D,		$89		$159		
3, 3D, 3P, 2P, 2P+		$113		$169		
HP Laser Jet 4, 111Si, XL300, 1200C				$218		$448
IBM Laser 4019, 4019E (3 5MB)		$129		$189		
IBM Laser 4029 ALL MODELS		$119		$189		
NEC 90, 290		$128				
NEC 95		$118				
OKI 400	$78	$98				
Packard Bell PB9500		$125		$198		
Panasonic 4410/4430		$129		$198		
Panasonic 4420/4450		$128		$198		
Panasonic 4450	$115					
Panasonic 4455		$129				
QMS 410	$119	$159		$249		
Star LS04	$129	$179		$269		
StarScript 4	$128	$178		$258		
Tosiba Page Laser 6		$99		$168		
TI XL/PS17/PS35	$48					

Major Laptop & Notebook Memory

MODEL	MEMORY	PART#	PRICE
AT&T Safari	2MB	37650	$148
	4MB	37651	$298
Bondwell B 310	1MB	23050-09100	$128
Dec pc 320 Notebook	2MB Mod	FR PCIM-BA	$149
	4MB Mod	FR-PCIM-BB	$298
	8MB Mod	FR-PCIM-BD	$498
Dell Laptop 212, 320N, 320N+	2MB Mod	310-3204	$129
Dell 325N, NC	2MB Mod	310-3210	$139
Dell NL20 & NL25	2MB Mod	310-3213	$148
Epson NB-3 Notebook	4MB	A808511	$238
Epson NB SL/	2MB Mod	A808771	$138
EPSON 25C Notebook	4MB Mod	A808781	$228
Everex Tempo LX, LX20	2MB	00160	$98
Everex Carrier	2MB	00263-00	$98
Grid 1500	4MB	52587	$238
Grid 1450SX	2MB	6200203	$148
Goldstar GS520, 386SX16	1MB	N/A	$98
	4MB	N/A	$298
NCR 3120 Notebook	4MB Mod	3120-K104	$299
NCR 3170 Notebook	4MB Mod	3123-K104	$399
Packard Bell, Magnavox, Mitsuba	1MB	N/A	$88
	4MB	N/A	$248
Panasonic CF170/270/370	1MB	CF-BA165	$64
Samsung Notemaster 386S	2MB	SNM002	$195
	4MB	SNM004	$395
Sanyo 17NB, 18NB & ZEOS	2MB	MBC-NBMEM2	$98
Sharp 6220	1MB	CE-621B	$98
Sharp 6640	2MB	N/A	$178
Sharp 4700MZ 200	1MB	CE-471	$198
Sharp 8501 Colorstar	2MB	N/A	$398
TI Travelmate 2000	1MB	2568034-0011	$108
TI Travelmate 3000SX, WINSX	2MB	2566996-0001	$118
TI Travelmate 4000, WINDX/25 SX/16, SX25, DX2/40	4MB	2581265-001	$279
DX2/50	16MB		$1495

AST COMPUTER Memory

MODEL#	MEMORY	PART#	PRICE
PREMMIA	4MB	501159-001	$247
	8MB	501159-002	$478
MANHATTAN SMP	16MB	501143-001	$868
BRAVO 3/25'S	2MB	500710-004	$118
	8MB	500824-002	$418
ADVANTAGE 386SX/20,25, PRO SX/25 BRAVO 3/33'S	2MB	500962-001	$105
	8MB	500962-002	$434
ADVANTAGE PRO 486DX/33 SX/25, BRAVO LC 4/25S, 33, 33S, 500 4'66D	2MB	500987-001	$108
	4MB	500987-002	$238
PREMIUM 386/25, 33, 33T II 386SX/16,20,25	1MB	500780-003	$59
	1MB	500780-002	$59
ADVANTAGE 486/25, 33,33P,SX20, BROVO 4/33,486/25 PREMIUM 4/25 33TE, SE 4/33	2MB	500718-004	$119
	2MB	500780-005	$119
ADVANTAGE 486/25 33 33P,SX20,POWER PREMIUM 3/33 4/33 33S 50D 66D, PREMIUM 386/33TE 486/25,E 25TE,33,33TE, PREMIUM II 386/25,33 486/33,486SX/20 PREMIUM SERVER SE 4/33	4MB	500780-004	$228
	8MB	500780-001	$498
POWER-EXEC 3/25SL 3/25SL C,EL	4MB		$238
	16MB		$1299
POWER EXEC 4/25SL	4MB		$248
PREMIUM EXEC 286,386SX/20,25,25C	4MB	500814-003	$228

TERMS: SHIPPING UPS (Min $8 25) Shipping charges are non refundable Purchase orders from Universities, Fortune 2000 & Government Agencies, NET 30 on approval of COD add $5 00 (Cashiers check)

FEDERAL EXPRESS DHL UPS

CONDITIONS: 20% Restocking Fee on refunds within 30 days No refunds or exchanges after 30 days - WARRANTY REPLACEMENT ONLY ALL PRICES FINAL. PRICES SUBJECT TO CHANGE. Mfg part #'s for convenience only Trademarks are registered with their respective Co.'s. 386, 387, 287, SX, are trademarks of Intel Corp.

AD # PCC1193

684 Wells Road
Boulder City, NV
89005

NEVADA COMPUTER

CIRCLE 415 ON READER SERVICE CARD

THE SPACE SAVER SOLUTION

Very Low Radiation VGA LCD Monitor

- Desk Saving Size 12.4W x 10.6H x 2.5" D(6.3" w/feet)
- 10.6" Diameter Screen
- Hi-Contrast B/W
- 32 Level Gray Scale
- Simple Installation
- Windows™/VGA/EGA/HGA/CGA Modes
- Controller Card Included
- 8/16-bit compatible
- All power supplied thru interface cable
- CRT output provided
- Includes Utilities Disk
- 1 Year Warranty
- FCC Class "A" Approved
- Satisfaction Guaranteed

$799

Plus Applicable Sales Tax; Includes Shipping & Handling

ORDER NOW! with Visa/MC, Company PO, Check or M.O.

1-800-782-8288

FAX 1-310-534-8419

SEE US AT COMDEX Booth B438

DENSITRON

A Leader in LCD technology for over 10 years

3425 West Lomita Blvd., Torrance, CA 90505

HARD DRIVE WHOLESALERS

PREMIER

261MB IDE $224

CONNER IDE DRIVES				
CP-30174	170MB	IDE	17ms	$198
CP-30254	251MB	IDE	14ms	$242
CP-30544	540MB	IDE	10ms	$699

SEAGATE DRIVES				
ST-351A	42MB	IDE	28ms	$111
ST-3096A	89MB	IDE	14ms	$173
ST-3144A	131MB	IDE	16ms	$176
ST-3290A	261MB	IDE	16ms	$224
ST-3550A	452MB	IDE	12ms	$465
ST-11200N	1.05GB	FAST SCSI-2	10ms	$936
ST-12400N	2.1GB	FAST SCSI-2	9ms	$1799

QUANTUM SCSI DRIVES				
PD-1275	127MB	SCSI-2	17ms	$199
PD-2405	245MB	FAST SCSI-2	16ms	$262
PD-5255	525MB	FAST SCSI-2	10ms	$725
PD-12255	1.22GB	FAST SCSI-2	10ms	$1,085

408•559•1773 FAX: 408•559•0823

2059 Camden Ave., #333 San Jose, CA 95124

All merchandise 100% guaranteed. We accept VISA, MC, Discover, COD's and company PO's with prior approval. Prices, delivery and manufacturers subject to change. Returns require NHA; non-defective returns are subject to a 15% restocking fee.

Bright color. Bright price.

$2,599.

SPECIAL OFFER!

The BOXLIGHT 1285 ColorShow Projection Panel. Our brightest true-color panel. And for $950 off the list price, it's an unbeatable value.

- Compact, easy-travel panel
- 640 x 480 resolution
- PC and Mac compatible
- FREE remote and cables

Your direct source for all the bright answers.

- Widest selection
- Instant availability
- Overnight shipping
- 30-day guarantee

BOXLIGHT®

17773 Fjord Dr. N.E., Poulsbo, WA 98370
206/779-7901 • Payment: Visa, MasterCard, American Express, COD and Purchase Orders (some restrictions). Leasing and rental options available. 30-Day Money-Back Guarantee

Call Today 1-800-497-4007

CIRCLE 416 ON READER SERVICE CARD

Shhhh! Your computer is listening!

EarMic™

Multimedia Microphone

Perfect Pitches

Works with PC soundcards, audio equipment, or any microphone application

- Microphone and preamplifier
- Light weight
- Attaches to any surface
- Battery operated *
- Mini-audio plug
- Add your favorite earrings

* not included

$32.99

plus shipping & handling

To Order 24 hours

(800) 914-Ears

VISA, M/C, AMEX, DISCOVER

Dealers Welcome !
90-Day Warranty
All Sales Final

Or send check or money order to:

Blue Sky Technologies, Ltd.™

3987 Suite N, First Street Livermore, CA 94550 (510) 447-EARS

CIRCLE 417 ON READER SERVICE CARD

Portable Bar Code Readers

TimeWand® I DuraWand® TimeWand II

Data collection is fast, easy, and extremely accurate when using Videx portable bar code readers. Cordless operation, compact size, and light weight allow you to take the wands wherever the work needs to be done. **Call Videx today for your free information kit: 503-758-0521.** Prices starting at:

Videx

TimeWand I $298
DuraWand $495
TimeWand II $698

1105 NE Circle Blvd., Corvallis, OR 97330-4285
503-758-0521 • FAX 503-752-5285

TimeWand, DuraWand, and Videx are registered trademarks of Videx, Inc. GCO355

SEE US AT COMDEX, BOOTH #L1497

CIRCLE 418 ON READER SERVICE CARD

BEST 9-TRACK TAPE SOLUTION OF THE 90'S!

• PC 286/386/486
• RISC/6000 • AS/400
• SUN • HP • DEC • APPLE

Our name begins with Quality!
Call us today for price and information.

QUALSTAR®

9621 IRONDALE AVE., CHATSWORTH, CA 91311
FAX (818) 882-4081 • (818) 882-5822

ONLY $89!

POWER TOOLS

Add Greater Music And Sound Capability To Your Sound Card.

Turtle Tools For Multimedia™ brings the music and sound capability of your sound card to its fullest potential.

It's fun. It's easy. It's for everyone who has ever wanted to create and play music ... whether you are a complete amateur or a professional.

Create your own music; produce a business presentation; play songs on your PC keyboard; edit voicing, mix levels, tempo, key, etc. ... and make beautiful professional quality sound.

See your favorite dealer, or call **800-645-5640** today!

Turtle Tools For Multimedia includes ...
- 5 multimedia programs.
- 350 sound effects on CD (CD ROM not required).
- 90 MIDI files.

WORKS WITH ANY SOUND CARD!

TURTLE BEACH SYSTEMS
P.O. Box 5074 • York, Pennsylvania • 17405
717-843-5916 • FAX 717-854-8319

CIRCLE 420 ON READER SERVICE CARD

EPP: THE NEW ENHANCED PARALLEL PORT!

IF YOU HAD KNOWN THIS BEFORE!

THE portable Shuttle Family is the most advanced range of parallel port peripherals available today. Not only do they operate on the new Enhanced Parallel Port (EPP), they transfer data at speeds up to 1 MB per second. Intel's new EPP is the standard PC-interface of the future. Virtually all the latest notebooks have EPP already, and no desktop is introduced without it (over 4 million PC's to ship next year).

On an EPP port, a Tape Shuttle will backup your data as fast as the tape drive can run (like SCSI). With our Turbo DAT Shuttle this may be up to 44 MB/min. (You don't have an EPP in your PC yet? Our Shuttles are the fastest on standard printerports too (up to 17 MB/min.), if that's not good enough, we'll offer you a low cost Plug-in EPP Card.

HERE'S THE LIST THAT NOBODY WILL MATCH:

- No cards needed, works on ANY parallel port!
- Widest range: Tape, DAT, Disk, CD-ROM and Opticals. From 128 MB to 8 GB!
- DOS, NetWare, Windows, OS/2, Mac and Unix software available!
- Full support of EPP! Up to 44 MB/s per minute!
- Installs in seconds! No config.sys. changes!
- Excellent software, comprehensive, but easy to use!
- Retrieves any file in seconds with DFA!
- Works with all ASPI software, like Central Point, Syntos Plus and ArcServ!
- Operates on either parallel or SCSI!
- Concurrent printing!

CALL US TODAY! FOR DETAILS OR YOUR ORDER WITH MONEY BACK GUARANTEE.

COMPUTER CONNECTIONS® EXCELLENCE IN DISTRIBUTION

Computer Connections,
83 Boston Post Road, Sudbury,
Massachusetts 01776
Offices in Germany, France and The Netherlands

(800) 438-5336 or (508) 443-3131

(508) 443-4942

CIRCLE 419 ON READER SERVICE CARD

BOOST YOUR IMAGE!

Business Computing Buyers ought to see your company and its products in living color... Show them who you are in PREMIER—the affordable four-color showcase that wins confidence and results from PC/Computing's 854,658 paid readers.

Call your account representative today.

PC/COMPUTING PREMIER
800-825-4237

Learn WordPerfect® In Two Hours...Guaranteed!

Our Certified WordPerfect Instructors teach you the powerful features of WordPerfect through the advantages of video training. Join the thousands of individuals, corporations, government agencies, hospitals, and universities who have saved time and money with our guaranteed WordPerfect training. Try any of SoftVision's easy-to-follow videos at no risk under the terms on our **UNCONDITIONAL 30-DAY MONEY-BACK GUARANTEE**. Call, mail or fax your order today.

Visa, MasterCard, Money Orders, Purchase Orders, and checks accepted. Please indicate video title, quantity, special offer if applicable, shipping/billing address, and phone number. All orders processed same day as received. Add $5 for single tape orders, $12 for multiple (up to 4) tape orders for shipping and handling. Utah residents add 6.25% sales tax.

SoftVision
INTERNATIONAL L.L.C
1240 East 800 North
Orem, Utah 84057 U.S.A.
FAX: (801) 225-8559

TO ORDER CALL
1-800-S-4-VISION
(1-800-748-4746)
Canada: 1-800-563-1069
U.K. 0793 849996

WordPerfect is a registered trademark of WordPerfect Corporation

NEW

WORDPERFECT SIX.0
$99.95 / tape (3hrs. ea.)
• Introducing • Intermediate
• Advanced • Flip and Tricks
• 5.1 to 6.0 update

WORDPERFECT 5.2 FOR WINDOWS
$69.95 / tape (3hrs. ea.)
• Introducing • Intermediate
• Advanced • Tips and Tricks

WORDPERFECT 5.1 FOR DOS
$49.95 / tape (3hrs. ea.)
• Introducing • Intermediate
• Advanced • Tips and Tricks

WORDPERFECT FOR VMS
$199.95 / tape (3hrs. ea.)
• Introducing • Intermediate
• Advanced • Tips and Tricks

WORDPERFECT FOR MAC
$49.95 / tape (3hrs. ea.)
• Introducing • Intermediate
• Advanced

SPECIAL OFFER
ALL FOUR 6.0 WP DOS TAPES
$199.95
ALL FOUR 5.2 WINDOW TAPES
$169.95
ALL FOUR 5.1 DOS TAPES
$169.95
ALL FOUR VMS TAPES
$739.95
ALL THREE MAC TAPES
$119.95

COMING SOON:
WP OFFICE 4.0, LOTUS, NOVELL, MS-DOS 6, WINDOWS

CIRCLE 421 ON READER SERVICE CARD

DATABASE MAILING AND MARKETING

Save up to 38% on 3rd-class postage! Discover how you can professionally manage your mailing lists on your PC with **ArcList** and **AccuMail**. These easy-to-use programs pay for themselves! AccuMail corrects and standardizes addresses, adds the ZIP+4 and delivery point barcode, so you receive optimal postal discounts. ArcList eliminates duplicates, will merge/purge lists, performs postal presorting.

Boost the performance of your direct marketing efforts. For a copy of the ***FREE*** Mail Flow Planning System diskette from the postal service, call **1-800-368-5806**.

CIRCLE 422 ON READER SERVICE CARD

BEAT THE LOTTERY

Gail Howard's *ALL NEW* Smart Luck ADVANTAGE PLUS™

- **The ONLY Software with Documented Jackpot Winners**
- **Includes ALL histories for 59 State Lotto Games FREE.**
- **No Other Software Has MORE Scientific Tools for Picking Winners • Automatic Smart Picks™**
- **Use ADVANTAGE PLUS™ & you'll trash all your other lottery software.**
- **A $295.00 Value. Special Offer Limited Time Only $79.95 + $3.00 S/H.**

VISA **GO WITH A PROVEN WINNER! CALL 1-800-876-4245** MasterCard

SMART LUCK SOFTWARE, Dept. S-8 • P.O. Box 1519 • White Plains New York 10602 • 800-876-GAIL (4245) or 914-761-2333 • IBM Comp.

39 LOTTO JACKPOT WINNERS WON $79.2 MILLION WITH GAIL HOWARD'S SMART LUCK® SYSTEMS!

CIRCLE 423 ON READER SERVICE CARD

THINKING OF COPYING?

THINK AGAIN

CALL THE BUSINESS SOFTWARE ALLIANCE

ANTI-PIRACY HOTLINE AT 1-800-688-BSA1 (2721)

CIRCLE 424 ON READER SERVICE CARD

Guaranteed Lowest Price Single & Multi-Line Voice/FAX Mail

NEW!

Price Breakthrough!
Powerful Multi-Line Voice Mail & Fax On Demand Systems Starting At Just ~~$1,599~~ $499!

Now your business can have the cost-saving, money-making benefits of multi-line voice mail and fax on demand at the lowest price ever. The new Multi-Com system answers and routes incoming phone calls, takes reliable messages, provides voice information to your callers and, with the fax upgrade, lets callers retrieve fax documents from your system.

Multi-Line Call Processing Power
Multi-Com handles up to 10,000 voice mail boxes, each with its own greeting and password. It can even notify your pager when you get a message. The base system handles two calls at the same time, giving each caller the same individual, professional attention.

Easy Installation & Setup
Multi-Com uses a mouse-driven interface to make setup fast and easy. Setting up your call processing system requires no programming experience.

Full Background Operation
Multi-Com doesn't tie up your computer. It runs completely in the background so you can use your computer for other things.

Grows & Expands With Your Business
Start with a low-cost 2-line system and add more lines & fax on demand later. Order today.

- ✓ Multi-line call processing.
- ✓ Complete background operation.
- ✓ Digital display pager support informs you as soon as you receive a message.
- ✓ Easy mouse-driven, graphical interface gets you running fast.
- ✓ Predictive dialing lets your PC call hard-to-reach people & notify you when contacted.
- ✓ Automatically purges old messages.
- ✓ 10,000 password protected mailboxes.
- ✓ Detailed logbook with reporting lets you review all events by date, name, box number, duration, status, etc.
- ✓ Expands to handle up to 6 phone lines.

- **Multi-Com 2-Line System $499**
- **Multi-Com 1-Line FAX System $499**
- **More Single & Multi-Line Systems Too! As Low As $199—Call For FREE Catalog**

24 Hour Voice Mail Demo (805) 524-5407
30 Day Money Back Guarantee • Order 24 Hours A Day

CENTRAL COMPUTER PRODUCTS

1-800-456-4123

Serving Computer Users Since 1982

FAX Your Order 1-800-723-2987

330 Central Ave., Fillmore, CA 93015 • (805) 524-4700 • (805) 524-4026 FAX • Add $8 S&H

CIRCLE 426 ON READER SERVICE CARD

The Next Generation in Label Design Software

LabelWorks™ for Windows

LabelWorks sets the new performance standard for professional quality label design. No other program combines such easy operation with this much power! **$295.00**

- Provides Desktop Publishing features to enhance label design. Features include: WYSIWYG, rulers, guides, page zooms, lines, shapes.
- Rich text support allows you to edit font styles, types, and sizes within the same line.
- Supports all major Bar Code symbologies, including Code 39, 93, 128, POSTNET, UPC, Bookland EAN. 19 types in all.
- Imports & Exports using TIFF, GIF, BMP, PCX, WPG, WMF, TARGA graphic files.
- Rotates Text, Bar Codes and imported graphics in 90 degree increments.
- Prints labels on virtually any windows supported printer.
- Prints labels directly from dBase, DIF & ASCII files.

Dealer Inquiries Welcome.

Call for Free DEMO Software

AMERICAN MICROSYSTEMS
2190 Regal Parkway, Euless, TX 76040
(800) 648-4452 (817) 571-9015 FAX (817) 685-6232

PRICE BREAKTHROUGH

VOICE & FAX MAIL

LOADED WITH UNIQUE FEATURES

	1-line	4-line	6-line
VOICE MAIL	$149	$699	$999
SMART VOICE MAIL*	$199	$999	$1,499
FAX-on-DEMAND	$299	$1,499	$1,999

**Includes Caller Verification & Contact Management SW*

Fully configured 386 based, 10hr to 100 hr systems available.

N E W ! N E W ! N E W !

AUTOMATIC POWER ON / POWER OFF

T E L E P O W E R ™

S A V E S M O N E Y & E N E R G Y

Turns the power "ON", as soon as the phone line rings, Shuts the power, 90 seconds after communications end.*

FULLY AUTOMATIC OPERATION

the perfect companion accessory for all

MODEM, FAX & VOICE MAIL CARDS

at introductory price of **$49.95,** order today

SPEAKING DEVICES CORPORATION

3671 Enochs, Santa Clara, CA 95051, (408) 481-9200

DISPLAY YOUR CONFIDENCE!

Your four-color Premier ad gets out more than the word to 854,658 Business Computing Experts who are spending over $100,000 a year on PC hardware, software, and services.

It shows them—with full-color depth and dimension—your commitment to long-term business...your confidence in your products. Seeing is believing! Call today for details on what a difference you can make with an affordable display in Premier!

PC/COMPUTING PREMIER

800-825-4237

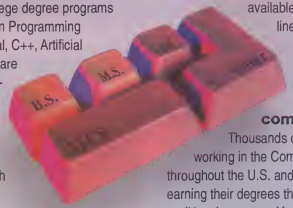
Keys To Success

Take Control Of Your Future With A College Degree In Computer Science

Now you can get the opportunity and earning power a college degree confers—without leaving home and without spending thousands of dollars.

The AICS home study program:

- B.S. and M.S. college degree programs
- In-depth courses in Programming Languages, Pascal, C++, Artificial Intelligence, Software Engineering, Compiler Design, and much more.
- Approved Ada course available
- All courses through home study



Proven acceptance in business, industry, and government.

Many leading corporations have approved the AICS program for their employees. More than 75 employers have paid the tuition for their employees, including a number of Fortune 500 companies and government agencies.

AICS lowers the cost of a college degree without lowering the standards.

The academic program includes comprehensive courses using the same textbooks used in major universities. Qualified instructors are available on telephone help lines.

Join students from leading computer companies.

Thousands of men and women working in the Computer Science field throughout the U.S. and around the world are earning their degrees through the AICS non-traditional program. You can be one of them.

For a free catalogue call:
1-800-767-AICS
Outside U.S.:
1-205-323-6191
Fax 1-205-328-2229
2101-COF
Magnolia Avenue
Suite 200
Birmingham, AL 35205

AMERICAN INSTITUTE FOR COMPUTER SCIENCES

The leading edge of learning

© 1992 AICS

Original Masters
for under 35 Cents A Piece...

THE SERIES-$19.99

The clip art images contained in these wonderful full-color collections are categorized into 24 themed packages, from Business & Industry to Sports and Leisure.

Sophisticated and Versatile Original Hand-Drawn Clip Art
Full Color Graphics that maintain their Impact in Black & White
Windows/DOS Compatible

Masterclips
The Art of Business

Available now at your local retailer or call **(800) 292-CLIP(2547)**

Masterclips, Inc. 5201 Ravenswood Rd. Suite 111 Ft.Lauderdale FL 33312-6004

CIRCLE 427 ON READER SERVICE CARD

Introducing SST A New Standard in Multimedia Software

that will make your presentations soar!

Now you can develop any **sales presentation**, **school report**, or even a **family scrapbook** using the power of multimedia. With **SST**, you can produce dynamic presentations complete with scrolling text, sound, narration, graphs, pictures, video–even interactive capabilities. **SST** works like a slide carousel and a VCR player with point & click and drag & drop controls. Plus it utilizes **two revolutionary operating techniques** that no longer require you to learn complicated script languages or deal with time-based editing systems. In fact, it's so easy to use, you'll create a multimedia presentation in less than 60 minutes. **GUARANTEED.**

suggested retail price **$149.95**

Get into the multimedia action with SST.

For the distributor nearest you, or to order, call **(612) 531-0603**

SUPER SHOW & TELL

AskMe Multimedia Center

7100 Northland Circle•Suite 401
Minneapolis, MN 55428
fax (612) 531-0645

MPC Multimedia PC

MS-DOS 5.0 or higher required (not included)

FOR DOS

3D Office™

Create and walk through your office design projects in 3D color!

All New! 3D 256-Color Office Design

Clip & Go

View your floor plans as full-color, 3D renderings or walk through with a simple click of the mouse.

- *Create Professional Designs*
- *3D Walk Through*
- *More Than 400 Predrawn 3D Design Objects*
- *Conventional & Modular Furniture*
- *Full-Size Plans--No Plotter Needed*
- *Fixed-Asset Management*
- *True Solid Modeling*

DesignWare
17 Main Street, Watertown, MA 02172
PH: (617) 924-6715 Fax: (617) 924-1699

To Order, CALL:
800-536-2596

CIRCLE 428 ON READER SERVICE CARD

CD-ROM DIRECT

738 Main St.
378
Waltham, MA 02154

DIRECT FROM SUPPLIERS!

CD-ROM and Multi-Media products at low, low prices!

TOSHIBA **3401, 200 MS DOUBLE SPEED DRIVE** — $399

COMPTON'S **MULTI-MEDIA ENCYCLOPEDIA** — $99*

GROLIER'S **TOOLWORKS ENCYCLOPEDIA** — $62

MICROSOFT **BOOKSHELF** — $55

SOUND BLASTER **STUDIO 16 BIT SOUND CARD** — $199

*when purchased with a drive or sound card

ASK ABOUT OUR LIST OF TITLES

1-800-332-2404
DOMESTIC ORDERS

1-617-332-2445
INTERNATIONAL ORDERS

SONY/TOSHIBA/HITACHI STYLE CADDIES
$4.99/caddy
min. 10 per order

CIRCLE 430 ON READER SERVICE CARD

VGA▸TV Elite. Big-Screen Multimedia Presentations Made Easy.

Under $400!

FEATURES
640x480 resolution
16.7 million colors
Flicker-free video
Light weight

Just connect VGA-TV Elite to a VGA card and any TV and *presto!*...big-screen presentations. It's that simple. Compare VGA-TV Elite's features to any of the alternatives (all unwieldy and costing up to 10 times as much), and you'll easily see there simply is no other choice.

FREE! With every VGA-TV Elite, get "Presentation Tools" software—featuring 3 super presentation features

Advanced Digital Systems
Call **(800) 888-5244** 8am-6pm M-F Pacific Time
2020-A State Rd•Cerritos, CA•90701•(310)865-1432•(310)809-6144 (Fax)

VGA-TV Elite. Easily the Best.

CIRCLE 429 ON READER SERVICE CARD

Join the Club for Greater Savings

Up To 90% OFF

On All CD ROM Titles

Call 1-800 779-1991 To Order

Education/Reference

	Retail Price	Your Price
Spaca Adventure	99	42
CD-Deluxe	99	45
Groller's M/M '92	395	88
U.S. History	395	40
Microsoft Bookshelf	295	88
Willie Beamish	129	30
National Geographic Mammals	169	30
Family Doctor	169	30
Publish It!	199	33
Street Atlas U.S.A.	295	125
World Atlas M/M	149	23
U.S. Atlas	149	23
Time Mag Almanac '91	149	38
Referenca Library	149	28
Barney Bear	129	38
Education Master	129	30
U.S. Presidents-George	169	125
Compton's Interactive	295	169
U.S. Atlas w/Auto Map	99	29
Carmen San Diego Deluxe	129	38
Animals MPC	99	33

Entertainment

	Retail Price	Your Price
Arthur's Teacher's Trouble	129	37
Composer Quest	99	43
National Parks	99	30
Game Pak II	160	32
Mother of All Gift Art	35	18
Trump Deluxe Gamu	149	40
MPC Wizard	59	20
Playing w/ Language	99	38
Dinosaur Adventure	99	45
Battle Chess Enhanced	159	35
PC Sig 12	89	38
Audobon Birds	149	30
Photo CD Accass	59	25
Countries of the World	295	188
CIA World Factbook M/M	99	30
Just Grandma & Me M/M	99	73
Game Master	99	30
Phoenix 3.0	89	16
CD Storytime v.1	99	28
CD Storytime v.2	99	38
Eco Quest	129	86
Loom	90	32
Secrat of the Luftwaffe	89	31
Stellar 7 M/M	89	30
Monkey Island	89	31
Space Quest IV	99	38
Putt, Putt Joins the Parade	99	55
Magazine Rack	99	29
Great Cities 1 or 2	99	33
Time Table of History	99	23
U.S. Wars (Choose)	99	45
Mayo Clinic	99	33
Global Explorer	295	195
Electric Home Libarary	89	36
Playing w/Langiegas (choose)	99	38
Media Clip 4 Pak	129	40
Font Master II	89	30
Guinnass Records 1993	89	38
Beauty & The Beast	89	26
Timetabla of Arts & Entertainment	149	38
VGA Spacfrum 2	99	40
Who Killad Sam Ruppart	99	50
Jonas In The Fast Lana	79	25
Kings Quest V	79	30
Mixed Up Mother Goose	79	30
Sherlock Holmes Detective	99	28
Business Mastar	79	38
Brain Drain	49	23
Mirror Mirror	49	23
CD Storage		9

36 Disc Cabinet $9.00 – Headphones & Speakers

Home of the SONY CD-ROM Caddy

Japanese Sony Caddy	$4.75
New CD³ Storage System	CALL
TEXEL 3024, Int. Bracket, PAS16	CALL
Toshiba 3401 w/PAS16	CALL

Complete Listing by Fax FREE Product Brochure 1-800-779-1991

SofTec Plus
4021 E. Grant Rd., Suite 201
Tucson, AZ 85712
FAX 602-325-5402

CIRCLE 431 ON READER SERVICE CARD

It's FREE! Absolutely, positively, totally FREE! No strings! No commitment! No shipping! No handling! No nothing! FREE! FREE! FREE! FREE!

It's your FREE introductory issue of

Metatec's **NautilusCD**℠

The Multimedia Magazine™ on CD ROM

This is not a misprint. It's an honest-to-gosh offer for a FREE introductory issue of NautilusCD, The Multimedia Magazine on CD ROM.

NautilusCD is the premier showcase of multimedia creativity. Our contributors are multimedia's superstars, wizards who can make your computer screen flash to life with moving pictures...play music or sing for you...dazzle your eyes with 3-D graphics...and even talk to you! It's an experience not to be missed. You'll get a subscription offer with your FREE issue, but no more will come – and neither will any bills – until you tell us "OK, I've gotta have it!" So call for your FREE issue now!

To order call toll-free 1-800-448-2323

Available in Macintosh and Windows versions. CD ROM drive required.
Limited Time Offer. One CD ROM per inquiry. International callers-1 614 766-3165

NautilusCD The Multimedia Magazine
7001 Discovery Boulevard, Dublin, Ohio 43017

CIRCLE 432 ON READER SERVICE CARD

OVER 15,000 NEW Programs on...

3 CDROMS!

NIGHT OWL'S great deal SHAREWARE CD-ROM! Than BBS system operator? They've made NIGHT OWL Reel #1 choice! THOUSANDS of BBS systems use NIGHT OWL'S SHAREWARE CD-ROMS for their file dutabases.

Now... for a limited time... we are introducing you to a THREE CD-ROM SET which contains most of the NEWEST shareware on the market! Night Owl's version 7.0, 8.0 and the new 9.0 at a HUGE savings!

$79

THOUSANDS of program areas including: Windows, DOS, Science, Jobs, Business, Home, Games, Kids, Music, Mind Games, Cards, Sports, Tarot, Nutrition, HAM Radio, Communications, Network/LAN, CS/2, Word Processing + 1000 + MORE!

The MARKetplace! Box 10125, St. Louis, MO 63115 1-800-989-1ROM

CIRCLE 433 ON READER SERVICE CARD

COMPLETE BIBLE BOOKSTORE ON DISK!

JUST DIAL

1-800-423-1228

FOR YOUR *Free Catalog!*

BIBLE RESEARCH SYSTEMS

2013 WELLS BRANCH PKWY. # 304 • AUSTIN, TEXAS 78728

OUTSIDE U.S. & CANADA CALL 512-251-7541

NOW YOU CAN HAVE YOUR SOUND, AND SEE IT TOO.

Learn To Speak Spanish 4.0 with Quicktime™

HyperGlot has the most extensive line of foreign language products for the PC or the Macintosh in these languages: Spanish, French, German & Italian. Ask about a competitive upgrade to Learn To Speak Spanish 4.0!

Learn To Speak Spanish 4.0

A complete first-year language course with extensive Quicktime™ video & sound on CD. Thirty context-driven lessons & an intuitive interface make learning Spanish easy & fun!

It's a whole new era.

1-800-290-4568

To order or to receive a free catalog call toll-free or write: P.O. Box 10746, Knoxville, TN. 37939-0746
Learn To Speak Spanish 4.0 is also available from most major software retailers.

HyperGlot™ the foreign language software company.

CIRCLE 434 ON READER SERVICE CARD

er Module for Language Learning • • • *New Grammar Module* for Language Learning • • • *New Grammar Module* for Language Learning • • • *New Grammar Module* fo

POWER TRANSLATOR™

ENGLISH to/from SPANISH, FRENCH & GERMAN

Make Your Word Processor Multilingual!

Translate everything from legal documents to technical manuals; requests for quotation to distributor memos; at a price easily within reach of a personal user. New **Grammar Module** provides *interactive* foriegn language education for students, business executives and government administrators.

Your Competive Edge in the new international market place is POWER TRANSLATOR.

Talk to your software supplier or call *Globalink* direct:

1-800-255-5660

NOW JUST **$299**

(Suggested Retail Price)

Globalink™
9302 Lee Highway,
Fairfax, VA 22031
Phone: (703) 273-5600
Fax: (703) 273-3866

CIRCLE 435 ON READER SERVICE CARD

You've read the book.

Even the best home repair book can't really show you what to do. Photos or illustrations are often confusing and hard to follow. You need the *Home Survival Toolkit for Windows*™. This new software program uses animation and sound to demonstrate, step by step, how to do hundreds of common home repairs.

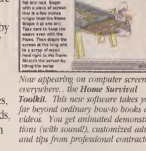
Now see the movie.

Discover how to wire a light switch, fix a dripping faucet, replace torn shingles, unclog gutters, find studs, patch walls... and much more. Learn the right way to use saws, drills, chisels, sanders and dozens of other tools.

WINDOWS SYSTEM REQUIREMENTS: 100% IBM-compatible PC, Windows 3.1 or higher, 2 Mb RAM; hard disk with 12 Mb free space; EGA or VGA monitor.

GET PERSONALIZED ANSWERS. How many gallons of paint should you buy for your bedroom? How much concrete to patch your driveway?

FREE GIFT Order now get this 8-piece Screwdriver Set — free! Eight flat-head and Phillips screwdrivers in a tough plastic case.



Now appearing on computer screens everywhere... the ***Home Survival Toolkit****. This new software takes you far beyond ordinary how-to books and videos. You get animated demonstrations (with sound!), customized advice and tips from professional contractors.*

Simply key in the dimensions and *Home Survival Toolkit* automatically calculates the amount you'll need.

YOUR INSTANT REFERENCE. Get the information you need, instantly, with the built-in *Survival Guides*. They'll help you select the best stain remover. Choose the right adhesive. Or track down just about any product with the database of toll-free numbers.

MONEY-BACK GUARANTEE

If you are not completely satisfied with the *Home Survival Toolkit*, simply return it within 30 days for a full refund.

Only $39.95

plus $4.95 shipping and handling.

To order, call toll-free:

1-800-772-4554

Ext. 29

Or mail check to:
Books That Work, Inc.
P.O. Box 629000
El Dorado Hills, CA 95762

© 1993 Books That Work, Inc All rights reserved

NEW for Windows! No CD-ROM required.

CIRCLE 436 ON READER SERVICE CARD

Perfect Gift for Windows™ Users...

The World's Most Complete Bartending Reference Software For Home Or Professional Use! Just In Time For The Holidays!

OVER 3,500 DRINK RECIPES.

Complete editing and sorting fuctions doing the work of dozens of books all at the click of a mouse!

PC BARTENDER™

Version 2.0

A PERFECT GIFT FOR YOU OR A FRIEND!

Order yours TODAY through the American Bartenders' Assoc.

Only $34.95 *plus $2.95 S/H*

VISA and MasterCard

1-800-935-3232

UneekWare, Inc./First Quantum Int'l • Tampa, FL (813) 681-0061

CIRCLE 437 ON READER SERVICE CARD

NOW YOU'VE GOT THE POWER

VIEW
CONVERT
PRINT
your files with
PANORAMIC!
for Windows

✓ ***Instant File Viewing***
AT LAST A UTILITY THAT ALLOWS YOU TO VIEW THE CONTENTS OF YOUR FILES DIRECTLY FROM THE MS-WINDOWS FILE MANAGER. YOU HAVE THE POWER TO VISUALLY NAVIGATE YOUR FILES BY VIEWING THE CONTENT OF EACH FILE PRIOR TO DELETING, COPYING, RENAMING OR LAUNCHING AN APPLICATION WITH PANORAMIC! YOU CAN ZIP IN & UNZIP IN PARALLELS WITHOUT OPENING ANOTHER APPLICATION!

✓ ***Convenient Printing***
PANORAMIC! ALSO FEATURES CONVENIENT PRINTING THROUGH USER FRIENDLY DRAG AND DROP. PANORAMIC! GIVES YOU ALL THE FACILITIES TO CREATE PICTURE PERFECT OUTPUTS.

✓ ***File Conversion***
PANORAMIC!'S EXTENSIVE FILE CONVERSION CAPABILITY LETS YOU TRANSLATE FILES TO A VARIETY OF GRAPHICS AND TEXT FILE FORMATS WITH FULL CONTROL OVER COLOR AND RESOLUTION.

- *FAST ZOOM AND PAN*
- *PREFORM TEXT SEARCHES*
- *COPY TO CLIPBOARD*
- *IMPORT ANY DATA TO YOUR APPLICATION*
- *BROWSE THROUGH YOUR FILES WITH EASE*
- *SUPPORTS MULTIPLE VIEW WINDOWS*
- *LINKS TO NORTON DESKTOP*
- *DRAG AND DROP SUPPORT*
- *SAVE SCREEN CAPTURES IN ANY FORMAT*
- *AND MUCH MORE ...*

PANORAMIC! FOR WINDOWS SUPPORTS MORE THAN 100 FILE FORMATS!

WORD PROCESSORS	GRAPHICS FORMATS	CAD SOFTWARE
Ami Pro 3.0	Calcomp PCL	AutoCAD
ASCII	CCITT Group 3 & 4	AUTOCAD
Microsoft Word	Compuserve GIF	Design CAD
Microsoft Write	Corel Draw (Sandard)	CAD Image & 4
Wes (Perfect	DB Binfo CGI	Dimension CADD
	Hercules Graphics	Microstation
SPREADSHEETS	HP GL plot files	
Lotus PIC	Lotus PIC	CAD FORMATS
Lotus 123	Macintosh MAC	Dimensions Files
Quattro Pro	Macintosh PICT	Autocad DXF Files
	Paintbrush PCX	Autocad DWG Files
DATABASES	Raster IMG, RLC, RLE	Complete Files
Alpha Four	TIFF	Interchange Files
Dataview	Windows BMP, CLP	Intergraph Files
dBase	Wordperfect WPG	Microsoft Draw
Foxpro		Microsoft Project RI
Paradox	POSTSCRIPT	Microsoft Project
	Postscript PS	Microsoft Project Mpx
LIBRARIES	and EPS files	Microsoft Project Mpt
Arcs - ZIP	see fully	Microsoft Project Mpd
Pkzip - ARC	supported	
Stuffit - LZH	AND MANY MORE!	CALL FOR A COMPLETE LIST

1-800-361-1904

Cimmerity Inc. (914) 735-0519
Systems inc. (C.S.I.) Fax (914) 735-6448

TRADEMARKS: Trademarks of Vendors Systems Inc. all other brand and product names are trademarks or registered trademarks of their respective owners.

CIRCLE 438 ON READER SERVICE CARD

Save Disk Space

PKZIP®

"PKZIP is the undisputed champion of data compression" - BYTE Magazine

"It [PKZIP] combines blazing decompression times and excellent compression speed" - PC Magazine

PKZIP version 2.0

PKWARE introduces the next generation of it's award winning compression utility, giving even greater performance levels than achieved with previous releases of the software.

Software developers, you can significantly reduce product duplication costs by decreasing the number of disks required to distribute your applications. Call for Distribution License information.

CIRCLE 439 ON READER SERVICE CARD

Put Your Executables on a Diet

PKLITE increases your valuable disk space by compressing executable (.EXE and .COM) files by an average of 45%. The operation of PKLITE is transparent, all you will notice is more available disk space!

Software Developers, save disk space and media costs with smaller executables. You can distribute your software in a compressed form with PKLITE Professional. PKLITE Professional also gives you the ability to compress files so that they cannot be expanded, hindering reverse engineering of your programs.

CIRCLE 441 ON READER SERVICE CARD

Compression for YOUR Application

The PKWARE Data Compression Library allows you to incorporate data compression technology into your software applications. The application program controls all the input and output of data, allowing data to be compressed or extracted to or from any device or area of memory.

All Purpose Data Compression Algorithm compresses Ascii or Binary data quickly. An adjustable dictionary size allows software to be fine tuned for maximum compression or speed. The routines can be used with most popular languages, such as C, C++, Pascal, Assembly, Basic and Clipper.

CIRCLE 440 ON READER SERVICE CARD

You may place your order for PKWARE products by phone, by fax or by mail. Prices listed are for use on a single computer, please call for multiple use information.

PKZIP 2 for MS-DOS	$47.00
PKZIP 2 for OS/2*	47.00
PKLITE	46.00
PKLITE Professional	146.00
Data Compression Library	295.00

Please add $3.50 Shipping & Handling per package in the US & Canada. $5.00 overseas. Wisconsin residents please add 5% state sales tax and applicable county sales tax.

Terms: ALL ORDERS OUTSIDE OF THE UNITED STATES AND CANADA MUST BE PREPAID. Mastercard, VISA, Check or Money Order drawn on a USA bank in US FUNDS. NO COD. Corporate Purchase Orders (Net 30 Days) accepted for software from large corporations within the USA & Canada. Please make remittance payable to PKWARE Inc. Prices & Terms subject to change without notice.

You can receive a catalog containing information on the complete line of PKWARE software by calling or writing.

* The PKZIP utilities for OS/2 offer all the functionality of the DOS version, plus HPFS and extended file attribute support.

PKWARE INC.

9025 N. Deerwood Drive Brown Deer, WI 53223
(414) 354-8699 Fax (414) 354-8559

PC/C 11/93

CIRCLE 442 ON READER SERVICE CARD

The Powerful, Graphical Desktop for Existing Systems!

QuikMenu III features:

Free form screen layout Choice of fonts and colors Automatic installation File Manager Icon Editor Calculator Appointment Calendar Phone Dialer Usage tracking Multilevel Password and Master Password protection User input prompting NOT memory resident PCX (pcx)/picture background wallpaper (req. EMS) Network compatible Supports Hercules/CGA/EGA/VGA Does NOT require Windows™.

Site Licensing and Demo disk available. Dealer and OEM inquiries welcome.

OSCS Software Development Inc.

$89.95

PC COMPUTING 1991 EDITORS' CHOICE AWARD

For a dealer near you, call

1-800-545-1392
(503) 389-5489 TEL
(503) 388-8221 FAX
(503) 383-7195 BBS

354 NE Greenwood, Suite 106 • Bend, OR 97701-6631

All brand and product names are trademarks of their respective holders

CIRCLE 425 ON READER SERVICE CARD

PhoneDisc®

Finds People and Businesses Anywhere... Instantly!

No more thumbing through volumes of phone books to locate lost family, friends and sweethearts. Use the latest state-of-the-art CD-ROM technology to find new suppliers. Begin a job search. Plan a trip. Verify credit applications. Locate debtors. Plan sales routes. Check for trademarks. And much more! Accurate listings from Database America. Only the official PhoneDisc® gives you Best QUALITY, Best SOFTWARE and Best PRICE.

Winner: IIA Best CD-ROM. OPA Achievement in Business.

Updated quarterly to insure quality.

PhoneDisc® USA Residential
Search 80+ million residences by name. Two disc set (Western & Eastern Regions).
ONLY $99

PhoneDisc® USA Business
9.6 million U.S. Businesses on one disc. Search by name, SIC code, business type, address or phone number.
ONLY $99

BUY BOTH RESIDENTIAL & BUSINESS AND SAVE. ONLY $159

PhoneDisc® Reverse. Extend your search power! Same powerful search software as above plus telephone and address searching of residences. 90 million businesses and residences. Buy the U.S. on five disc set or your geographic region

SPECIAL OFFER 5 Disc set ONLY $349 *$129 for one region*

See your local dealer or call to order:

CALL TO ORDER: **1-800-284-8353**

Digital Directory Assistance, Inc.
5161 River Rd Bldg 6
Bethesda, MD 20816

CIRCLE 443 ON READER SERVICE CARD

DeLORME

MAPEXPERT™

Version 2.0 — Completely Revised and Updated!

Your Route to Increased Productivity

MapExpert — a professional desktop mapping program — gives you a street-level map database of the entire United States, and the tools to customize and print high quality maps for any business need. One CD-ROM lets you:

- Locate areas by zip code, phone number, or place name
- Zero in on individual streets anywhere in the country
- Identify address ranges in major metropolitan areas
- Customize maps with graphic and text overlays
- Find latitude and longitude for any location
- Print high-quality maps in color or B&W
- Print mural maps...and more!

MapExpert's uses for increasing your business productivity are endless. Define delivery routes, outline sales territories, map out expansion strategies, plan property development, make nationwide travel plans, and more!

Now Only $295 Direct
Suggested Retail Price $495

Order Today
800·452·5931 ext. 8171

30-Day Money-Back Guarantee

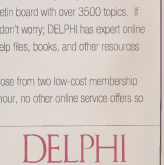
"...MapExpert is an amazing bargain."

DeLorme Mapping Company, Lower Main St., Freeport, ME 04032

CIRCLE 444 ON READER SERVICE CARD

Explore the Internet - FREE!

DELPHI, a leading international online service, now offers full access to the Internet. You can explore this incredible electronic network with no risk. You get 5 hours of evening/weekend access to try it out for free!



Use electronic mail to exchange messages with over 10 million people throughout the world. Download programs and files using "FTP," connect in real-time to other networks using "Telnet," and participate in "Usenet Newsgroups" the world's largest bulletin board with over 3500 topics. If you're not familiar with these terms, don't worry; DELPHI has expert online assistants and a large collection of help files, books, and other resources to help you get started.

After the free trial you can choose from two low-cost membership plans. With rates as low as $1 per hour, no other online service offers so much for so little.

5-Hour Free Trial!

Dial by modem, 1-800-365-4636*
Press Return once or twice
At Username, enter JOINDELPHI
At Password, enter PCC3X2

DELPHI

Questions? Call 1-800-695-4005 (voice)
Send e-mail to INFO@delphi.com

*Current Internet users can Telnet to delphi.com instead. Complete details provided during the toll free registration.

CIRCLE 445 ON READER SERVICE CARD

Earn $4,000 Per Month From Your Home With A Computer!

FREE CBSI 486 SX Business Computer

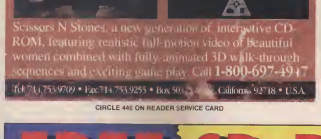
Quit spending money on your computer and let it earn money for you. This is a proven turnkey business an individual or couple can run. If you purchase our software and business program, we will give you the computer and printer. If you already own a computer, you may receive a discount. Begin part-time and still retain the security of your present position. Financing available.

To receive free cassettes and color literature, call toll-free:

1-800-343-8014, ext. 427

(in Indiana: 317-758-4415) Computer Business Services, Inc.

PNS Interactive presents an interactive virtual experience...



Scissors N Stones, a new generation of interactive CD-ROM, featuring realistic full-motion video of beautiful women combined with fully-animated 3D walk-through sequences and exciting game play. Call 1-800-697-4947

Tel: 310.753.9700 • Fax: 714.753.9255 • Box 90.3 • Irvine, California 92718 • USA

CIRCLE 446 ON READER SERVICE CARD

New CD-ROM Products

THE INTERACTIVE ADULT MOVIE ALMANAC

A database of 750 movie reviews and 250 adult star bios, complete with 1000 images, captions and many movie clips. Search by studio, star, film date, genre, director, etc. This disc is the ultimate reference for erotica, covering everything from the legendary Debbie Does Dallas to the new Virgin Island. Written by Jim Holliday and the brain-trust of Adult Video News. The definitive guide to erotic entertainment.

ID # CD9910 Suggested Retail $129.95

the interactive adventures OF SEYMORE BUTTS

Over 30 Minutes Interactive Custom Sex, A Romantic Fiction

ID#ECD902 $69.95

Inter-Action!

DREAM MACHINE Explore your fantasies!

ID#ECD903 $69.95

HIDDEN OBSESSIONS

THE ONLY FRACTAL MOVIE! #CD7001 Suggested Retail $69.95

VISA / MC ORDERS: 1 • 800 • 882 • 8959
DEALER INQUIRIES: 1 • 310 • 453 • 5066
FAX: 1 • 310 • 453 • 6513 Allow up to 10 days for delivery
new MACHINE PUBLISHING 2040 Broadway Santa Monica CA 90405

CIRCLE 447 ON READER SERVICE CARD

FREE CD-ROM DISC!

Mega Demo & Test contains 350 Megs of PC Shareware & PD software, including Spectral CD-ROM Benchmark and Test Utilities written by our programming staff, & NOT available on any other CD-ROM Disc. Our Special Test Utilities measure throughput as well as access time in a reliable and consistent manner for a meaningful real-world benchmark for CD drives. The Disc and Interface Software are fully functional (Even for BBS Use) and not crippled in any way. When purchased separately Mega Demo and Test is $14.00 plus $5.00 for S&H. However for a Limited Time This Demo and Test CD-ROM Disc is Free with any CD Disc purchase.

These are the Only Shareware & PD CD-ROM Discs with both a DOS and a Windows 3.1 "Hypertext" Retrieval Interface. Plus All CD Discs are BBS Ready, and include files.bbs plus our BBS Door with "Remote User" Mouseable Pull-Down Menu Interface.

PROFIT PRESS, 524 E. Ft. Lowell Rd., Tucson, AZ 85719 - Info (602) 770-0000 FAX (602) 770-0003 - (800) 770-0004

The prices listed above do not include shipping and handling. Special shipping and shipping to foreign countries is extra!

MasterCard VISA

S.R.P. $79.00 ea. — New! JUST RELEASED! New! — S.R.P. $79.00 ea.

Mega CD-ROM³ PC Shareware Sensational

650 Megs !! Plus Gigs Uncompressed Our Newest in The Mega CD-ROM Series. Contains Utilities of All Types, Word Processors, Data Bases, Communications, Graphics Tools, CAD, Business, Education, Programming, Hobby, Games, Sports, Sound Files, 256 Color GIF's, FLI's, Bytes, Fonts, Windows Programs, BBS, Plus Much More!

Mega Windows² Windows Shareware / Public Domain

Our Newest in the Mega Windows Series. This Disc Contains Windows Utilities of All Types, Windows Application Programs of All Types, Windows Communications Programs, Windows Games, Windows Fonts, Windows 256 Color Graphics BMP, Windows Sound Files WAV, Windows Drivers and Icons, plus OSO Shareware, and Much Much More!

Mega Games¹ PC Games, Graphics & Sounds

Contains PC Games from Shareware Companies such as Apogee, and Epic plus many others. Game Bytes Electronic Magazine, with file categories that include Arcade, Adventure, Puzzles, Mind & Strategy, War Games, Card Games, RPG Games, Plus 256 Color GIF's, FLI's of all types & includes Sound Files, MOD, ROL, WAV & VOC

Publisher Direct Price $29.00 ea. — Or All 3 New Mega Fantastic MEGA CD-ROM Discs for Only! $59.00

For Bidden Subjects™

This Disc Contains Hacking, Phreaking, Bomb Box Information, Anarchy Subculture, Magic, Internet & Computer Security Secrets, Bomb Plans, FBI & Police Not Files, Virus Code, Sick & Twisted Graphics, UFO, Occult, Even more Hacks Files, Plus Much Much More! Everything Full and Interesting. That Absolutely No One Wants You to Know About! Includes MegaSearch for those Fascinating Late Night Text Searches. 8 (If You Dare) for BBS there's files bbs Plus MegaDoor and MegaTerminal.

Our Exclusive! Special Price $39.00 S.R.P. $79.00 ea.

Genuine SONY Caddies $3.50 each with ANY $49.00 CD-ROM Disc Purchase Limit of 10 Per Customer

fao Gold "This Best of the Best! $31.00 much The Full Set! All 3 Only!

Volumes 1, 2, & 3 "Best of the Best" $99.00 SET

For Adults Only "GOLD" "Wife Proof Labels" Each Over 600 Megabytes: Many Not On FAO 123 - 256 Color SVGA GIF's with NO BBS Logos! Plus Animated FLI's, GL's, & DL's. Includes Games, and Fantasy Text files S.R.P. $79.00 each

fao

2 Disc Set 1,192 Megs contains over 11,000 Files! All 3 Only!

Volumes 1, 2, & 3 $69.00 SET

For Adults Only "Wife Proof Labels" 256 Color SVGA GIF's, Plus Animated FLI's, GL's & DL's Includes Games, & Fantasy Text files. 3 Disc Set 1,892 Megs - 10,000+ Files! S.R.P. for Set of 3 Discs $199.00

ORDERS ONLY! CALL TOLL FREE

1-800-843-7990

CIRCLE 448 ON READER SERVICE CARD

Sexy Software™
Sexy DISKS™

Sexcapades™ . . . The GAME
The First Adult Game
with TRUE SOUND and 256 Color VGA Graphics

The game everyone has been waiting for: First adult game you won't forget with a novel Arcade game of very daring friends! Fulfill your sexual desires. Find out how your partner would really like to make love! Over 80 Color VGA Scenes - Real Voices Guide the Action - Fantasy Option - Play with 2-8 Close Friends. Now supports SoundBlaster™ cards!
$79 – Special Offer **$69** with purchase of any CD disk / VGA and hard disk required - shipped on high density disks.

CONNOISSEUR COLLECTION ALL NEW! In 256 Color VGA!!
ALL movies have sound - play thru standard speaker or SoundBlaster™

Sexy Disk #CC1 = ★ YOU BE THE STAR ★ The FIRST CUSTOMIZABLE movie allows you to write the dialog and the title
Sexy Disk #CC2 = THE FIRST SOUND MOVIE! The first computer movie with SOUND! See the incredible 256 color VGA graphics while hearing the actual dialog. OURS EXCLUSIVELY!
Sexy Disk #CC3 = THE BEST MOVIE! The best computer movie available! Only for the serious collector! 256 stunning VGA scenes
Sexy Disk #CC4 = VOLUPTUOUS MOVIE with Sound! See and hear a symphony of exceptionally proportioned women
Sexy Disk #CC5 = GOODIES MOVIE with Sound! See men and women with unique attributes. UNBELIEVABLE!

Prices: 1 Movie $29, 3 Movies $65, 5 Movies $94

Sexy Graphics with SOUND!
Our EXCLUSIVE 256 color VGA graphics TALK and PLAY MUSIC through your standard speaker or thru a SoundBlaster™ card.

SG10– Top Heavy Mamie Disk - extremely amply endowed women TALK to you while you admire their HUGE proportions - SIZZLING!
SG11– Encounter disk - we can't describe the erotica! action you will see and HEAR - absolutely INCREDIBLE!
SG12– Swimsuit Disk - You will see the sexiest swimsuits while the girls TALK to you about their hobbies and turn-offs
SG13– Science Fiction Disk - You will see incredible space shots and alien encounters while hearing other-worldly descriptions and music

Each disk is over 1.2MB - plus **FREE DISK** with over 2.5MB of utilities for printing, cataloging, converting to WINDOWS WALLPAPER and changing the pictures. Req. VGA with 512K

Prices: One disk $19, 2 disks $35, 3 disks $49, 4 disks $59

ORIGINAL Sexy DISKS 6 disk set with movies, pictures, games ***$32***

Now You Can Have Your Own GIRLFRIEND™
. . . a sensuous woman living in your computer!

GIRLFRIEND is the first **VIRTUAL WOMAN**. You can watch her, talk to her, ask her questions and relate with her. Over 100 actual VGA photographs allow you to see your girlfriend as you ask her to wear different outfits, and guide her into different sensual activities. As a true artificial intelligence program, **GIRLFRIEND** starts with a 3000 word vocabulary and actually GROWS the more you use it. She will remember your name, your birthday on your likes and dislikes. **GIRLFRIEND** comes with the base software and **GIRLFRIEND LISA**. Additional girls will be added. This program requires 7-10MB of free space

SG3 GIRLFRIEND - Special Introductory Price **$69**, **FREE** - Second GIRLFRIEND Just Added

Sexy Software™
Sexy CD-ROMS™

FREE $99 Shareware CD-ROM
with purchase of any 3 CD-ROMS. Not a cheap demo disk - contains thousands of valuable programs in all categories – games, windows, business, education

Sexy-FLIX
Full Length Digital Movies . . . Ours Exclusively!

KING DONG – The dirtiest dinosaur movie ever made! CRYSTAL HOLLAND stars with Jimbo Lick, Hamburger, Jane Bunt, and lots of comic relief!
TOO NAUGHTY TO SAY NO - HARRY REEMS and GINGER LYNN star in an erotic cinderella story in a thinking action! for girls - I have CABLE! I DID HOME VIDEO! - BUD RAMBULL!
SEX GAMES - When a hacker tapes into a computer dating service he is able to program the ultimate fantasies of its member - SAUNDRA CHARLES!
Sexcapades . . . The MOVIE – See incredible users of a mouse and a joystick as a group of friends play our popular Sexcapades game!
NO HARD DISK SPACE REQUIRED – WINDOWS NOT REQUIRED

Sexy CD-ROMS

Sexy CD #1 the premiere adult CD-ROM! 1GB of adult material with 32KB VGA pictures, 8½ movies, 6½ stories, games DARE TO COMPARE!
Sexy CD #2 an exclusive collection containing over 800 Super VGA pictures (1024 x 768 x 256) and over 400 VGA pictures (640 x 480 x 256). These are pictures that cannot be found anywhere else! The women are the quality and stunning!
Sexy CD #3 another collection of over 800 MB of the hottest pictures available. Over 5,000 VGA pictures, movies and stories that will have you spending days just trying to see it all!
MEMORY-SAVING - NO COMPILATION

MIX & MATCH CD-ROMS
Sexy PIX™

GUNTY BABES • ECSTACY VOL. 1 & 2 • HOT PICS • 3 & 4 • PC PIX • 1 & 3
TROPICAL GIRLS • STORM 3 • EROTIC GIRLS • 7TH HEAVEN
EROTIC ENCOUNTERS • ADULT PALETTE • MY PRIVATE COLLECTION 1 & 2
ANIMATION FANTASIES 1 & 2 • PORKWARE

ALL CD-ROMS: First 3: **$99 each or 3 for $199**
PLUS FREE SHAREWARE CD-ROM!
Then **$69 each or 3 for $149**

NEW!! Exclusively imported from Europe!! 256 Color VGA Games
SG4 PORNTRIS - Adult version of the popular game. You reveal a hidden movie while controlling blocks falling down your screen. Multiple levels. MUST SEE!
SG5 PORNIPIPE - Adult version of Pipe for Windows (Windows not required) - Multiple mazes involved as the game progresses. HOURS OF FUN!
SG6 MOZAIK - Adult jigsaw puzzles with over 40 erotic pictures - you reassemble the most exciting women on earth
Price: $35 each or all 3 for $89

ADD $4 S/H • 3.5" Or FOREIGN ORDERS ADD $2/DISK • IN PA ADD TAX • MUST STATE AGE OVER 21 YEARS
VISA/MC Orders Only: 800-243-1515 Ext. 600VP / 24 HRS / 7 DAYS
Or CK/MO to: Sexy Software, P.O. Box 220,, Dept. 600VP, Hatfield, PA 19940

CIRCLE 449 ON READER SERVICE CARD

Introducing the First Adult Photo CD
Special Introductory Price of $129, save $70

See ex-Playboy Playmate, Teri Weigel, in the first adult Photo-CD. Enjoy these live action images, photographed during the filming of this critically acclaimed movie.

Experience the hottest trend in adult entertainment. Photo-CD technology takes adult CD-ROMs to an exciting new level of superb quality imagery. Discover the power of Photo-CD!

Windows, DOS and MAC versions available. Other titles available. Must be 21 to order.

UNLIMITED USAGE RIGHTS INCLUDED

STAR WARE PUBLISHING CORPORATION

WICKED

Starring Former Playboy Playmate
TERI WEIGEL

FREE Kodak's Photo CD Access Software

ORDER HOTLINE (800) 354-5353

Fax (305) 426-9801
BBS (305) 428-0012
Dealer Inquiries: (305) 426-4652

P.O. Box 4188
Dept. # 63
Deerfield Beach, FL 33442
Photo CD Symbol is a trademark of Kodak used under license

CIRCLE 450 ON READER SERVICE CARD

Purchaser must state age over 21

STARWARE PUBLISHING CORPORATION

So you're interested in Adult CD-ROMs - but with so many to choose from, how do you know which CDs are right for you?
Now, the Starware Adult Bundles make ordering easy. Each Bundle has been carefully selected to include only the BEST Adult CD-ROMs. So just pick the Bundle that best fits your computer expertise and interest.
To get you viewing pictures in a hurry, we have included our "Quick Start Instructions" with each Bundle.
You are guaranteed the best CD-ROMs at an UNBEATABLE PRICE!

Bundle #1 ..... "For Beginners" ..... *$160 value* ..... ***ONLY $119***
Instantly add thousands of GIF files and hundreds of movies to your computer erotica collection. Novice computer users will truly enjoy this hassle-free collection. These discs will work with any VGA computer and will always have a place in your menu. *"Includes Private Pictures and So Much Shareware."*

Bundle #2 ..... "Super VGA Lovers" ..... *$300 value* ..... ***ONLY $198***
Super VGA users will be delighted with this expert bundle set. This bundle is the largest adult collection of 1024x768 and 800x600 256 color GIF images. Computers equipped with 1 MB Super VGA adapters are highly recommended. *"Includes Volcano, Smutware and PQPIX 2.*

Bundle #3 ..... "Lights, Camera, Action" ... $300 value ..... ***ONLY $198***
Movie buffs will love these 3 CD-ROMs featuring the latest and greatest adult movies for your PC. Each disc has hundreds of the best multimedia, computer animation and video clip creations for mature computer users. 386 or 486-based computers are recommended. *"Includes Ecstasy, Storm 3 and Animation Fantasies 2.*

Bundle #4 ..... "Hot for Cable TV" ..... $300 value ..... ***ONLY $198***
Depending on your taste in adult material, this is either the worst or the best collection of 3 adult CD-ROMs. If you are timid or only curious about adult material, DO NOT get this bundle. A "diverse" group of subject matter is enjoyed on these discs. This bundle contains the most explicit GIF files and movies you find on CD-ROM. *"Includes GBL, B. Babes and E. Encounters. These names have been altered*

Prices Shown Are For Complete Bundles. Add $4 S/H. Add 6% Sales Tax If Applicable. Add $2 Per Bundle For Foreign Orders. Sorry, Canada Cannot Be Served.

"Contents of Bundles are subject to change"
Always the Lstest Titles
24 Hr. Hotline 800 354-5353

Voice 305 426-4552 *FAX 305 426-9801* *BBS 305 428-0012*

Send Check/Money Order:
Starware Publishing Corp.
PO Box 4188, Dept. 63
Deerfield Beach, FL 33442

$4.00 Shipping & Handling
$7.00 2-day
$15.00 Next day
$20.00 Foreign Express

Florida residents add 6% sales tax

CIRCLE 451 ON READER SERVICE CARD

ADULT

CLASSIFIED

COMPUTER RESET

USED COMPUTERS

IBM, COMPAQ & MAJOR BRANDS
LARGE SELECTION

MEMORY EXPANSIONS • PARTS
DRIVES • MONITORS • KEYBOARDS
CONTROLLERS & SOFTWARE
HARD-TO-FIND ITEMS

Computers from $169 Monitors from $49
CGA Color Monitors $129
Color Printers $249
TANDY NOTEBOOK Computer $199

FREE CATALOG

214-276-8072

P.O. Box 461782
DEPT. PCC
GARLAND, TX 75046-1782
FAX & BBS 214-272-7920

CIRCLE 501 ON READER SERVICE CARD

VGA Splitter

Made in USA

- **Works with all VGA, SVGA and RGBS monitors**
- **Bright, crisp reproduction on all monitors (100 MHz BW)**
- **Automatically powers up when computer is turned on**
- **Extension cables available**
- **2-chan $199; 4-chan $299; 8-chan $499**

800 – 959 – 5439

H & R TECHNOLOGY
SANTA ANA, CA (714) 641-6607

CIRCLE 502 ON READER SERVICE CARD

WORTHINGTON DATA SOLUTIONS

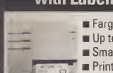
BAR CODE HEADQUARTERS
OFFICES IN USA AND EUROPE

Labeling Software

For PC with Dot Matrix or LaserJet

- Any Format, Any Size
- Formats for Sears, TCIF, K-Mart, Penny's, AIAG, WalMart, Logmars, etc.
- WYSIWYG Design
- Bar Codes: UCC-128, UPC/EAN, 2of5, MSI, 11, UPC/EAN, 2of5, 128, Code 39, etc.
- Big Text and PCX Graphics too!
- Powerful, Versatile, Easy to Use
- Imports ASCII data files from dBase, etc.
- Above Label Printed by LabelRIGHT™ – **$279**

Thermal Transfer Printer with Labeling Software



- Fargo's Allegro Printer
- Up to 4" label width
- Small size, only 20 lbs.
- Prints UPC/EAN, 2of5, 128, 39
- Scalable text & PCX graphics
- Packaged with LabelRIGHT thermal™ software, serial cable, ribbon & labels
- Complete package, ready to use – **$ 1895**

Bar Code Readers

for PC, XT, AT, PS/2, Macintosh and RS-232 Terminals

- Attaches as 2nd Keyboard
- UPC/EAN, Code 128, 2of5, MSI, Code 39
- Wand, Magstripe, CCD Slot Badge or Laser Scanner
- **Top Rated by Independent Review**
- Complete with Steel Wand – **$399**
- Complete MagStripe Units from – **$219**

Portable Bar Code Readers

for PC,XT,AT,PS/2,Macintosh, and Serial Interface Computers

- Battery Operated Reader — 3 AA Cells
- 64K or 256K memory
- Keyboard or Serial upload
- XMODEM upload
- Download Tables
- 2 built-in inventory programs
- UPC/EAN, 128, 2of5, Code 39
- Complete 64K Reader with Laser – **$1734**
- Complete 64K Reader with wand – **$799**

Ordering is Easy!

- **Same Day Shipping • USA Made**
- **Free UPS Blue in USA**
- **Qualified P.O.'s Accepted**
- **Free "800" Support**
- **30 Day Money Back Guarantee**

Call 408-458-9938 or Call Toll Free

800-345-4220

In Europe call information for Toll Free numbers to our Swiss Office or call 71 87 51 15 in Schweiz.

FREE PC TRAINING CATALOG!

Make your users more productive on Windows, DOS, Mac and more!

Choose from 3,000+ training products guaranteed to cut your costs.

Includes videos, software tutorials, and instructor-led courseware.

No personal or dealer inquiries.

Bin Computer Resources, Inc
100 Walnut Street
Glen Head, NY
(516) 676-9700
Fax: (516) 483-1754

800-363-7759

CIRCLE 503 ON READER SERVICE CARD

PRIZE-WINNING PC SOFTWARE

Easy Neural Networks
Easiest way to quickly learn about this fascinating new technology… includes a working Neural Network you can train! **$59**

PC Therapist IV
Hi-rez animated talking head talks thru the PC Speaker! First software to pass a limited Turing Test of conversational ability at the Boston Computer Museum! **$69**
Soundblaster version available **Add $18.95**

BOTH for $99 – Includes 3 Big Catalogs
and FREE Talking Expert System Demo! Please specify disk size or we ship 3.5'

TSI

Check, American Express, or P.O. to
THINKING SOFTWARE, INC.
46-16 65th Place, Dept. pcc-3000, Woodside, N.Y. 11377
3 Catalogs & Demo Disk Only $5. Please Phone: **718-803-3638**

CIRCLE 504 ON READER SERVICE CARD

77%
of PC/Computing subscribers initiate, select, or authorize computer product purchases.

Do they select you?

Get your share!
Call your PC/Computing Marketplace account representative at:

800-825-4237

Source: 1992 Buying Trends Market Study Wave III

BAR CODE READERS

AMERICAN MICROSYSTEMS

2490 Regal Pkwy. • Euless, Texas 76040 • (817) 571-9015

FOR PC, XT, AT, PS/2 & TERMINALS:

- No software changes required
- Data appears as keyboard input
- Reads Code 39, I-2of5, UPC/EAN, Codabar 11, 93, 128, MSI/Plessey
- Auto-discriminates between codes
- Accepts WAND, SLOT, MAG STRIPE, CCD, LASER
- Easy To Use

BAR CODE PRINTING SOFTWARE:

- For Epson, OKI, IBM, Dot Matrix and HP LaserJet Printers
- Prints Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey

PORTABLE READERS:

- Use as a portable, wedge or terminal
- Input Devices: WAND, CCD, or 5V LASER
- Real-time clock for date and time stamps
- Automatic power off with resume
- "Built-In" Inventory programs
- 54 key alpha/numeric keyboard
- Supports HAYES compatible modems

VISA

(800) 648-4452 • FAX: (817) 685-8232
30 Day Money Back Guarantee
One Year Warranty

CIRCLE 505 ON READER SERVICE CARD

REMOVE HARDWARE LOCKS

Protect your investment. Don't let a lost, stolen or damaged lock render your program worthless – costing you $$$$. Our SAFEKEY programs are guaranteed to UNLOCK the following:

SAFEKEY	PROTEL/WINDOWS
TANGO	3-D STUDIO
PADS PCB	TOPAS
MICROSTATION	LUMENA
PRISM DESIGNER	MasterCAM

from $250 plus S&H

VISA (609) 390-2799 MC
(609) 390-3750 FAX

IMAGINE THAT
1 EVERGREEN DR., SEAVILLE, NJ 08230

CIRCLE 506 ON READER SERVICE CARD

SAVE POSTAGE

- Mail for less.
- Speed deliveries.
- Reduce undeliverables.
- Eliminate duplicates.
- Programs and databases.
- Find new markets.
- Increase profits!

Call Now For FREE Catalog
1-800-800-MAIL

MAILER'S *Software*™
Your #1 Source for Direct Mail Software

CIRCLE 506 ON READER SERVICE CARD

BAR CODE COLLECTION

STAINLESS STEEL WAND/KEYBOARD WEDGE... only $299!
- *Attaches as 2nd keyboard*
- *No software changes*
- *UPC/EAN 128, 2 of 5, Code 39, Codabar, MSI*

WEDGE WITH LASER SCANNER (pictured) *...$995*

PRINTING SOFTWARE
PORTABLE TERMINALS
MAG STRIPE READERS
SLOT READERS

2-YEAR WARRANTY
30-DAY MONEY BACK GUARANTEE

1-800-486-0620

DATAVISION
30 INDIAN DRIVE, IVYLAND, PA 18974

CIRCLE 507 ON READER SERVICE CARD

CHURCH SOFTWARE

Discover for yourself why more churches are choosing **Power Church Plus.**®

Try out the leading membership and accounting package.

Call today for your free full-working Demo.

F1 SOFTWARE,
208 Ridgefield Drive,
Asheville, NC 28806

(800) 486-1800

CIRCLE 508 ON READER SERVICE CARD

NETWORK GAMES FOR MICROSOFT WINDOWS!

Play Chess, Backgammon, and Battle Boats against opponents anywhere on the network!

See your opponents moves as they happen in dazzling graphics!

Runs on all popular networks!

Get all 3 games for $29.95
call *G-LINK* at:
(800) 605-7262

CIRCLE 509 ON READER SERVICE CARD

Educational Discounts

DOS • Windows • Mac		Windows or Mac	
WordPerfect Bundle	**$159**	**PageMaker**	**$299**
Ventura v4.1	199	Quattro Pro	139
Corel Draw v3.0	299	FrameMaker	299
Mathematica	299	dBase IV v1.5	249
Norton Utilities	90	Paradox v4.0	249
Finale Music	299	Geneworks Pro	99
Generic Cadd 6.0	249	Borland C++v3.1	219

Hundreds More Titles Available at Super Savings!

CALL FOR DETAILS

1-800-444-7369

PERIPHERALS PLUS, INC.
5016 Hwy 9, Howell, NJ 07731
908-363-2424 Fax 908-363-3687

CIRCLE 510 ON READER SERVICE CARD

The Mail Order Wizard

A complete order-processing system for any size mail-order company. Includes list management, charge-card approvals, UPS manifest, and reports galore!

Systems from $495 to $6995

Call for free information or $20 demo. See why *Home-Office Computing* awarded the Wizard ☆☆☆☆

The Haven Corporation
1227 Dodge Avenue, Dept. PCC93
Evanston, IL 60202-1008

800-676-0098
(outside the U.S. 708-869-3434)

CIRCLE 511 ON READER SERVICE CARD

CLASSIFIED

B.S. & M.S.
In Computer Science

- ALL COURSES HOME STUDY
- Approved for tuition reimbursement by leading corporations
- Increase your earning power
- Join students from leading computer companies
- Approved Ada course available

FOR FREE INFORMATION CALL 1-800-767-AICS

AMERICAN INSTITUTE OF COMPUTER SCIENCES

The leadership of Engineers

CIRCLE 512 ON READER SERVICE CARD

Logos shown were designed with Logo SuperPower® elements

Logo Design Software

Logo SuperPower ® is a large graphic database. You use one or more "design elements" and modify them to create world-class logos in minutes. There are over 2,000 logo design elements. ALEPS format.

SuperPower 600 (600+ design elements)....$119
Upgrade 300 (300 new design elements).....$99
Upgrade 400 (400 more new elements).....$89
Upgrade 400 (400 more new elements).....$79

Buy any module, or buy them all for just $279.00. (Buy 1 now - buy rest in 30 days - get all for $279) For the PC. Requires Corel Draw, AEL, Micrografx, Illustrator, Freehand or similar drawing program.
To order, or for information, call

(800) 648-5646

Decathlon Corp. • 4100 Executive Park Dr.
Cincinnati, OH 45241
Phone (513) 421-1308

CIRCLE 513 ON READER SERVICE CARD

Slide Imagers®

Overnight $4.95 Slides & Canons

Digital Output

- Slides/Overheads
- Dye-Sub Output
- Large Color Posters
- Canon Fiery Lasers
- Slide Duplication
- 4x5 Neg/Pos/B&W

Photo Cn™ Scans $.90

Rushes in by 3 P.M., out same day
Free Return Federal Express Call For Details

(800)232-5411

Authorized Imaging Center
22-26 St. • Astoria, NY 11105 • 914-873-3353

CIRCLE 514 ON READER SERVICE CARD

RFFlow
Professional Flowcharting
For Microsoft® Windows

Create professional, fine quality charts quickly and easily. Call for free trial disk. (303) 563-5787 FAX (303) 569-4889

$129.00 RFF ELECTRONICS
1053 Sarazen Court Loveland CO 80538

CIRCLE 514 ON READER SERVICE CARD

Consolidated CD ROM

315 E.Ely Avenue
Philadelphia, PA 19120-4304
(800)B-CD-ROMS • (215)276-3637 • Fax(215)276-3834

CD ROMs – Commercial and Shareware

Shareware Studio: Our best seller! 640 Megabytes of mostly working programs in virtually every area of interest for your consideration. Excellent search and retrieval interface. Simple to use. Price: $88 ..... $39.95

Sound Effects Library: Hundreds of WAV files you can use in presentations or for fun—comes complete with Multimedia Sound Studio for Windows™. $149.95

Megaclip: Fantastic compilation of 5000, 360×480 graphic images. Mac and image 8-bit. Very user friendly. $34.95

Special Offer ..... All about Sex – $99.95

Science Hits Post Vol 1 - XXX 1000's of Sizzling Hot GIFs and Animations Plus 885 ..... $39.95

Busty Babes Vol 3, XXX 1000's of GIFs just for the Pervert Hearted and Fantasies New Vowel Hits: 885 ..... $39.95

Adults Only Special (Must be 21) $99.95

Panasonic 562 (Dual speed) 300 K/sec transfer rate. Power the MPC standard. Complete with cables and interface $349.95

SoundBlaster Pro Deluxe stereo sound card $149.95

Complete Multimedia Upgrade $499.95

Call for current pricing on these great programs:

Mac Hacker Bookshelf Personal Assistant Kid Grid Explorer Grand Adventure Kings Quest VI Monarch Notes
MPC Sampler Mixture Street Atlas USA Dictionary

plus 100's of other titles to choose from!

Free Catalog!

Sales are Guaranteed • Fast Ground Shipping (Where available)

Principals only • Wholesale

CIRCLE 515 ON READER SERVICE CARD

AMIGA • IBM • MAC • WINDOWS •

You are Invited

to sample the world's finest selection of leading software.

Presented by the world's largest distributor of shareware.

Call for information.

SMC

SOFTWARE OF THE MONTH CLUB®
5616 DRYDEN PLACE • CARLSBAD, CA 92008

PH: 619•931•811, EXT. 509 • FAX: 619•929•1163

GENERAL INTEREST • CLIP ART • GAMES • UTILITIES

CIRCLE 516 ON READER SERVICE CARD

Software Labs

WORLD'S LARGEST SHAREWARE DISTRIBUTOR

Selected by IBM as a supplier for software testing.

See why IBM chose our professionally tested virus-free library.

Call TOLL FREE or write for our free world famous 92-page catalog with exclusive 12 BONUS DISK offer.

100 CORPORATE POINTE, SUITE 195
CULVER CITY, CA 90231

800-569-7900

FAX: 310-410-2044

CIRCLE 517 ON READER SERVICE CARD

THE AMISH OUTLAW
THE SHAREWARE COMPANY

10 MOST WANTED

1 **Solar Winds** - A unique combination of fast paced arcade action and an outer-space role playing game. With 256 color VGA and animated graphics. (JOYSTICK) (VGA) (SB)

2 **Major Stryker** - An excellent shoot'em up game from Apogee. Major Stryker's mission is to destroy the evil aliens and return home to the beautiful Yoshira. (VGA) (SB)

3 **Zone 66** - An ultra high tech 32-bit arcade game for 386 &486 PC's. You pilot your fighter jet through a 360 degree scrolling combat zone that is jam packed with enemies & terrain. (VGA) (Sound Blaster) (Joystick) (HD) (2 Meg RAM)

4 **Monster Bash** - Help Johnny Dash save his dog from evil chuck. The most animated game dapper has created to date (Sound Blaster) (VGA)

5 **Overkill** - An excellent graphic shoot 'em up game in which you destroy planet after planet gaining power as you progress from planet to planet. (VGA) (SB)

6 **Ancients** - Graphic intensive D&D style game. Guide your band of warriors through a fantastic medieval world full of danger and adventure. (VGA) (mouse required)

7 **Cotacomb Abyss 3D** - You're a power hit wizard trying to destroy the ultimate evil sorcerer. Battle mazes, skeleton warriors and zombies as you explore the catacombs. (PC 13)(588k of free ram) (EGA,VGA) (Hard Drive) (Sound Blaster)

8 **Wolfenstein 3D** - You are a POW in Nazi Germany. The object is to escape from prison. Don't miss the great 3-D graphics on this game. (VGA) (Sound Blaster)

9 **Megaman** - Enter the labyrinth combat zone and hunt down the adversary, experience the highest level of virtual reality combat available in shareware to date. (2 can play by modem) (VGA) (Hard Drive) (mouse optional) (2 disks)

10 **Gateworld** - Captain Klondike meets the G.O.R.E.O. machine in an adventure in this great arcade action game. (VGA) (Sound Blaster)

$3.00 per disk for 1-9 disks, $2.50 per disk for 10 or more disks. 3.5" & 5.25" same price. Add $3.00 for Shipping

The Amish Outlaw
10 Most Wanted
3705 Richmond Ave.
Staten Island, NY 10312

Call 1-800-947-4346 for FREE Catalog

CIRCLE 521 ON READER SERVICE CARD

FREE CATALOG

1.800.447.2181

Selection — Virus-Free — Software — $2/Disk — As Low As — Large Quality

PC SHAREWARE
JAP member

1763 Garnet Ave. • San Diego, CA 92109
619.272.6673

CIRCLE 518 ON READER SERVICE CARD

99¢ SHAREWARE SPECTACULAR

FREE CATALOG

OVER 600 PROGRAMS
NO Minimums, NO Gimmicks, NO Clubs
Business, Windows, Games, Education

Wolfenstein 3D, Megatron, Jill of the Jungle, Lemmings, Pretty Women, Freebies, Windows Games (Tetris+), Windows Poker, Icons, Family Feud, BBS list, PC Talk, Resume Professional, Animate, Unprotect, Booklet maker, Legal forms
(Multiple disk sets are 99¢ per disk.)

24-Hour, Toll Free Ordering

SHAREWARE EXPLOSION CD-ROM – $49

Over 3,000 Programs - Menu Driven
We Carry a Full Line of Graphics CD-ROMS

S Software, 2880 Bergey Rd., Dept 600WP
Hatfield, PA 19440 • (215) 997-2470

CIRCLE 519 ON READER SERVICE CARD

SHAREWARE

for IBM

Same cost for 3.5" or 5.25"

Ship & Hand only $2/order

REGULAR ITEMS $1.25

WOLF3D GALACTIX ANCIENTS
MAHJONGG #1CLYDE NEOPAINT
LASTHALF MEGATRON 1993TRIS
DARKAGES KEEN DREAMS
NEVER LOCK removes copy protection

SPECIAL ITEMS: $2.00

MONSTER BASH SOLAR WIND
CATACOMB ABYSS ZONE 66

No tricks! No minimums! Order Now!

FREE CATALOG !
Visa Mastercard
ComPro Software
P.O. BOX 4426
Star City, WV 26504
1-800-PC-DISCS

CIRCLE 520 ON READER SERVICE CARD

Free Spirit Software
CD-ROM

1-800-638-5757

Mon - Fri: 8am - 9 pm Sat: 7:30 am - 7:30 pm Sun: 9 am - 7:30 pm EST

American Express · Discover · MasterCard · VISA · COD

International Orders: (317) 878-4738 FAX Orders: (317) 878-4751

Chestnut CD ROMS your choice $12 each

Biblea & Religion - New & Old Testements, study guides, covers Judaism, Christianity, Islam
Clipart Goliath - Thousands of images for all uses, in PCX & TIFF format! For DTP programs
Encyclopedia of Sound - Over 250 sound files by the Music Factory in WAV format
Complete Bookahop - An entire bookshop. Includes classics, poetry, humor, history, more!
Deethstar Arcada Battlas - Exciting VGA space wers, shqot-em-ups, sports, & more
Dictionaries & Language - Dictionaries, thesaurus, word proc, style/spell checkers, foreign languages
HAM Radio v3.0 - Packet radio, satellite, freq lists, service, mods, SSTV, FCC regs, exams, more!
Our Solar Syatem - Exciting NASA photos & planetarium programs, star/planet locators
Sharawara Overload! - 600MB, all kinds of applicetions, ZIPPED! Lots of Windows progs, & games
Sound Senaational - Sound Effects, voices, music, utils, for AdLib & SounBlaster, & other cards
TachnoToola - C/C++, Basic, dBase, networking, Unix, OS/2, Windowa, essembly, Pascal, more!
Too Many Typefonta - Countless typefonts in ATM, TrueType, Ghostscript, HP Laser, and more
Windoware - Utilities, wallpaper, education, icons, font installers, games, and more for Windows
World Travalar - Photos by Michael McGrath & Paul Elmendorf in PCX and GIF format

NEW! Chesnut CD-ROM Titles

Legal Guide - 500 legal forms form the authors of BBS Legal Guide
Gardening - Handbook for the home gardener with layout, planting instructions, etc.
Computer Reference Library - Step-by-step hardware and software tutorials.

CD-ROM Hardware

CD-ROM Drives

BackPack CO (Transportabla)	389.00
Mitsumi CO-ROM HH Internal	169 00
Taxel OM3024 (drive only)	359 00
Toshiba XM-3401B (drive only)	379 00

Sound Boards

Pro Audio Spectrum 16	179 00
Sound Blester Oeluxe	99 00
Soundblaster 16 ASP	219 00

CD Caddies
Sony Type
$5.00

CD *ROM* Multimedia Magazine Information on latest CD-ROM releases **$3.00**

$639	Sony CDU-561 + MediaVision PAS16SCSI + Speakers + 1 Software Bundle
$629	Teac CD-50 + MediaVision PAS16SCSI + Speakers + 1 Software Bundle
$529	Texel DM3024 + MediaVision PAS16SCSI + Speakers + 1 Software Bundle
$499	LMSI 206 + MediaVision PAS16LM + Speakers + 1 Software Bundle

CD-Format : Audio-Combined, Mode 1 & 2 Data Discs, CD-Audio Discs, CD-ROM XA (pictures).
Audio compatibility: MPC and MS Windows with MultiMedia, AdLib, Sound Blaster, & Real Sound.

Software for Bundles Above (Please order by number)

1. MPC Software Toolworks Encyclopedia (Grolier's), MPC US Atlas, MPC World Atlas, MPC The Animals!, MPC Guiness Book Of World Records (1993)

OR

2. MPC Software Toolworks Encyclopedia (Grolier's), MPC US Atlas, MPC World Atlas, MPC The Animals!, Reference Library

OR

3. MPC Software Toolworks Encyclopedia (Grolier's), MPC US Atlas, MPC World Atlas, MPC Mavis Beacon Teaches Typing, MPC ChessMaster 3000

OR

4. The Secrets of Monkey Island (5 Languages), Sport's Best(3 games, 4 languages), MPC Wizard, CICA Windows Programs & Utilities, Jets and Props, World View

OR

5. The Secrets of Monkey Island (5 Languages), Sport's Best(3 games, 4 languages), Languages Of the World (Windows), CICA Windows Programs & Utilities, Kodak Photo CD Access (Windows)

Need more descriptions? Call for our latest catalog.

Over 700 CD-ROM Software Titles in Stock!

Business

11 Million Bus Phone Nos 19.00
American Business Ph Bk 15 00
Autodesk Explorer 69 00
Britannica Selact Softwara 19.00
Business Assistent 15 00
Bueineaa Tools 19.00
Business Library V1 45.00
Business Master 19 00
Career Opportunitiea 25.00
Dstabesa Mada Eaay 19.00
Essantial Home & Bus Coll 33.00
Homa Office Softwsre 30.00
Intn'l Bus & Econ Atlas 25.00
M Beacon Teaches Typing 19.00
Microsoft Works 45.00
My Advncd Labal Deeignar 39.00
North Americen Fax Book 25 00
PhoneOisc USA Business 69 00
PhoneDisc USA Residential 79 00
Pro Phone 1993 Mid-Year 129.00
Pro Phone Businesa 1993 25.00
Q&A 49 00
Secrate Executiva Succaas 29.00

Clipart & Graphics

Action 19.00
Animation Magic 57.00
Animation Festival 28 00
Animals in Motion 39 00
Business Backgrounds 30.00
CD Cad 3.7 25.00
Classic Clips Treilers 25.00
Clipart Galore 25.00
Clipart Golieth 12 00
Clipart Heaven 25.00
Clipmaster Pro 30 00
Color Magic 19.00
Corel Art Show III 39 00
Deep Voyaga 35.00
Oesktop Pub Dream Oisk 29 00
Dasignassurus II w/ 'Raptor 35.00
Electronic Lib of Art 25.00
Encyclopedia of Clipart 19.00
EPS Pro Vol 1 129.00
EPS Pro Vol 2 129.00
Fantszia Fonts & Sounde 29.00
Font Funhouse 33 00
Fontmaster 1 15.00
Fontmaster 2 15.00
Fonta for Pro Publiehar 27.00
Fractal Ecstacy 39.00
Fractunea 29.00
Fresh Arte 25 00
Full Bloom 35 00
Gallery of Dreams 15.00
GIFS Galaxy 29 00
GIFs Galore 15.00
Homa Daaigner DOS/WIN 29.00

Hot Nawa Animationa 29.00
Jets & Props 19 00
Just Fonts 19 00
Key Fonts Pro 29 00
Kodak Photo CD Access 15 00
Mada in tha USA 29.00
Mega Clip CD 19 00
MPC Wizard 14 00
Mother of All Clip Art 15.00
Publishers Peredise 25 00
Publish it 2.0 (OOS) 15 00
Publish it 3.0 (Win) 59 00
Ouicktoons 35.00
Real Clips 33.00
Renaissance Masters 1 or 2 29 00
Resource Library Graphics 19 00
SFX 19.00
Sci-Fi Fantesy 19.00
So Much Screenware 25 00
Space, Time & Art 69 00
Video for Windowa 35.00
View from Earth 59 00
Visions of Saturn 19 00
VGA Spectrum 1 12 00
VGA Spectrum 2 15 00
World of Trains 29 00

Educational

Amencan Journey 1896-1945 39 00
Animels, The 19 00
Apollo (Space Series) 33 00
Audubon Birds or Memmals 17 00
Barney Bear School 14.00
Berney Beer Space 14 00
Barron'a Book Notea 39.00
Berlitz Think & Talk French 105 00
Berlitz Think & Talk German 109 00
Berlitz Think & Talk Italian 109 00
Barlitz Think & Talk Spanish 104 00
Britannica Family Choice 21.00
Csrmen San Diego 24.00
Compton's Femily Choice 29.00
Olnosaure M/M Encyc 79.00
Education Master 15.00
Electricity & Magnetism 39.00
European Monerchs 29.00

Kid'a Can Reed:
Aesop's Fables
Cinderella
Heather Hits Her 1st Home Run
Long Herd Oey At The Ranch
Moving Gives Me A Stomech Ache
Mud Puddle
Paperbag Princess
Scary Poems For Rotten Kids
Tale Of Benjamin Bunny
Tale Of Peter Rabitt
Thomas' Snowsuit
Your Choice 25.00 aach

Leam Speak Spanish 49 00
B Bear's Laarning At Homa 29.00
Let's Play 15.00
Macmillan Oict for Children 19 00
Monarch Notes 57 00
Multimedia Computer Tutor 19 00
Nat Geog Memmals 25 00
Playing w/ Language English 25 00
Playing w/ Language French 25 00
Playing / Language Japanesa 25 00
Playing w/ Language Spanish 25 00
Vocabulearn Spanish 45 00

Entertainment

Aegis Guardian Fiaet 54.00
Arthur's Teacher Trouble 18 00
B-17 Fortress/Silent Svc 39.00
Battle Chess 25 00
Blua Forca 45.00
Chess Maniac Nat Lampoon 45 00
Chessmaster 3000 18 00
Conan the Cimmerian 25 00
Cursa of Enchantia 24.00
Cybergenic Ranger 15 00
O & O Fantesy Empire 49 00
Dracula Unlsaahed 59.00

DUNE 38.00
in stock

EcoOuest 29.00
Eric the Unready 39.00
European Racera 39.00
Eye of the Beholder 3 49 00
F-117A Steaith Fightar 49.00
F-15 Strika Eagle III 49.00
Fetty Beer's Birthday Surp 54 00
Fatty Bear's Fun Pack 39 00
Fly & Orive Spectecular 45 00
Four Oueens Comptr Casino 39 00
Funny (Jokes CD) 39.00
Gama Arana 15.00
Game Pack II 25 00
Gemea 1993 25.00
Gamea Bonanza & AntiVirus 15.00
Games for DOS 15.00
Gamewara Collection 19.00
Goferwinkle's Adventures 33 00
Gunship 2000 39.00
Guy Spy 24 00
House of Games 19 00
Indiana Jonea Fate Atlantia 45.00
Inspector Gadget 35 00
Jokes & Pranks 15 00
Jones in Fast Lane 15 00
Jutlend 49 00
PC Keraoke 59 00
King's Ouest 5 15 00
King'a Ouest VI 34.00
Lasarsoft Top Tracks 49.00

L Bow 2: Dagger Amon Ra 29.00
Leadar Board Collection 25.00
Legend of Kyrandie 45 00
Loom 25 00
Lord of tha Ringe 49.00
Lost Treasures Infocom V1 49.00
Lost Treasures Infocom V2 49.00
Manhole 29.00
Mad Oog McCree 45 00
Maniec Mension. Oay Tntcle 45.00
Mantis 19.00
PC SIG World of Games 15 00
Pecific Islands 29 00
Ringworld 49.00
Pentomino 25.00
Private Eye Mysteries 45.00
Putt Putt Joins the Parade 43.00
REBEL ASSAULT 49.00
Ringworld 56.00
Rotor 15.00
Scooter's Megic Castle 54 00
Scrabble Oeluxe 29.00
Secret \ Luftwaffe 23.00
Secret Monkey Island 15.00
Seventh Guest 45.00
Sherlock Cons 1 22.00
Sherlock Cons 2 42.00
Sherlock Cons 3 55 00
Space Quest IV 15 00
Sporting News Pro Ftball Gd 35.00
Strike Commander w/Tact M 59.00
Triple Tris Challenge 33.00
Wacky Funster 25.00

Victor, Vector & Yondo
Last Dinosaur Egg
Hypnotic Harp
Vampire Coffin
Cyberplasm
Just $39.00 Each

Willy Beamish 15 00
Wing CMOR 2\Sec Missions 49 00

Literature

Aesops Febles 30 00
Classic Collection 55.00
Desktop Bookshelf 15 00
Hound of Beskervilles 35 00
Interactive Storytime V1 15 00
Intaractive Storytime V2 25 00
Interactive Storytime V3 33.00
Just Grandma & Me 36 00
Kaa's Hunting 35 00
Magazine Rack 25 00
Mixed Up M Goose 15 00
Mowgli's Brothers 35 00

Miscellaneous

1001 Utilities 15 00
CD Speedway 57.00

Classic Collection 89.00
Jewel Cases 1 00
Lightning 69 00
Nautilus Bac Pac V1 39 00
Nautilus Bac Pac V2 39 00
Nautilus Mini Subscription 25 00
Romware Magazine 15.00
PC Medic 19 00

Music & Sound

Killer Trak CO 12 00
MIOI Connection 49 00
MIDI Music Shop 19 00
MS Musical Instrument 55.00
MS Stravinski 59 00
Resource Library Audio 19 00
Sound Effects Library 27 00
Sound Library 15 00
Win CO 29.00

Programming

Authorware Star 33 00
C Users Group Lib 19 00
IBM Library for AIX 9 00
IBM Network Softcopy Coll 9 00
LAN Master 25.00
MS-OOS Collection 15 00
Programmers ROM 29 00
Simtel 20 13.00
Source C CD 19 00
X11R5\GNU 19.00

Referenca

Aircraft Encyclopedia 25 00
Bible Librsry 25.00
CO-ROM Deluxe Pack 29.00
Cinemania 55 00
Compton Upgrade & Switch 89 00
Consumer Informetion 19 00
Dict Living World 29 00
Encyc Win 1.0, S T 39 00
Family Doctor 23.00
Food Analyst 35.00
Great Naval Battles 59 00
Guiness 1993 27 00
Health & Medical Oirectory 109 00
History of the World 59 00
Holy Bible & Christian Shware 19 00
Home Remadies 33.00
JS New Prague Cookbook 25.00
King Jemas Bible 19 00
Langueges of World 29 00
M S Bookshelf 93 55 00
Map Expert w/Str AtlasUSA 249 00
Mayo Clinic 19.00
Microsoft Encarta 249.00
M/M Animals Encyclopedia 45 00
Murmurs of Earth 45 00
Oxford English Ref Lib 99 00
Plant Ooctor 27 00
Prescript Orugs 29 00

Reference Lib, S.T. 25 00
Return to the Moon 33 00
Total Baseball 1993 43 00
USA State Factbook 29 00

Shareware

All American Series Shrware 25 00
Amsoft World Ham Radio V2 29 00
Californie Collection 15 00
CICA Windows 12 00
Cream of the Crop 29 00
Ooctor of Games 19 00
Hacker Chronicles 25 00
Hall of Fama 15 00
Ham Call April 1993 47.00
Libns Britannice 37.00
M/M Shw Explosion 19 00
Monster Medis '93 29 00
Night Owl 9 25 00
PC SIG 12 15 00
Phoenix 4 0 15 00
Phoenix Phun & Games 25 00
QRZ Ham Radio 19 00
Shareware '93 25 00
Shwre Explorer DOS/WIN 29 00
Shwre Extravaganza (4 disks) 39 00
Sherewere Gold 2 19 00
Shareware Heaven 19 00
Shareware Magic 39 00
Shereware Perlen 2 29 00
Sherewere Studio 2 19.00
Software Veult 1 12 00
Software Vault 2 15.00
Softwere Vault Gold Coll. 19 00
Super CD Vol 1 or 2 19 00
Top 2000+ Shwre 19.00
Ultimate Games Collection 15 00
Ultimate Shwre Coll 23.00
Up All Night 19.00
Wild Cat Gold 39.00
Window Master 19 00
Windows 1993 25 00
Winware #3 17 00
Wizpeck 19 00

Travel

Adventures 39 00
Global Explorer 89 00
Great Cities V1 or V2 19 00
Great Wonders World V1/V2 35 00
Hong Kong At Its Best 19 00
Hospitality Index 29 00
Nationel Parks 19 00
New York at its Best 19 00
PC Globe 45 00
Street Atlas USA 89 00
US Atlas w Automap 19 00
World Atlas 3 2 17 00
World Atlas US Atlas Combo 27 00
World Vista 49 00

Order with Check, Money Order, VISA, MasterCard, American Express, or COO Order by phone, mail, or fax Note there is no surcharge for credit card orders For the contiguous U S , CO-ROM software shipping is $5.00 per order (not title), or $9 50 if COO Alaska, Hawaii, Puerto Rico, Mexico end Canada add $8 00 per CD-ROM software order for shipping Costs for shipping hardwere, or, orders to foreign countries not mentioned, are quoted at time of order Indisna residents please add 5% sales tax Not responsible for typogrephical errors Please research your product purcheses as all sales are final All products are covered by manufacturer's werrenty Prices end availability ere subject to change without notice

Free Spirit Software, Inc. Free Spirit Software, Inc. - PO Box 158 - 109 W Pearl Street - Trafalgar, IN 46181 Questions? Phone (317) 878-5348

CIRCLE 522 ON READER SERVICE CARO

Distributor's of

SHAREWARE

for

IBM Compatibles
Commodore 64/128
Amiga

Call Or Write For
Free Descriptive Catalog's
Specify Computer Type
Virus - Free

DISKS O'PLENTY INC
8362 Pines Blvd., Suite 270E
Pembroke Pines, FL 33024
For Orders Or Catalog's Call
1 (800) 963-7750
Or Call
1 (305) 963-7750

CIRCLE 523 ON READER SERVICE CARD

Best Files in the USA!

Channel 1®

- 100,000 NEW Shareware Programs
- Special FREE Downloads Area
- INTERNET – Email AND Newsgroups
- Hi Speed 100 line Mega BBS!
- Online Games and Entertainment!
- Adult, Business, Games, Windows, Graphics and Music Libraries
- FREE Daily Financial Markets News

Use Your New V.32/V.32BIS Modem!
No Surcharge

Set Your Modem to 8-N-1 and Dial
617-354-3230

CIRCLE 524 ON READER SERVICE CARD

DISK DRIVE REPAIR
NOTEBOOK REPAIR
DATA RECOVERY

BUY & SELL HARD DRIVES & NOTEBOOKS

REPAIR PRICES - HARD DRIVE

20-39mb	55
40-59mb	65
60-99mb	89
100-160mb	115
161-299mb	135
300-399mb	215
400 +	295
Test & Evaluation	10

NOTEBOOK REPAIRS FROM $99
LOWEST PRICES ON DATA RECOVERY
CLASS 100 CLEAN ROOM

VISA, M/Card, AMEX, Direct, PO's welcome
Call for Brochure

jb TECHNOLOGIES, INC.
800-688-0908
6105 Maureen Lane, Moorpark, CA 93021

CIRCLE 525 ON READER SERVICE CARD

TrueType Logo Font!

Customization of Logos and Signatures as True type fonts.

Logos and signatures will work in any Windows application and offer the benefits of being **High Quality**, **Scalable** to any size, **Easy to Use** (print logo by selecting one character), **Easy to Find** (it's in the font menu!), **Reduces Document Size** (typically saves 50K byte compared to a bit-map). The service is affordable. One signature font is **FREE** with every logo purchase. The Logos are priced relative to their complexity.

Fax us your Logo for a Quote

Other Custom services include: Electronic forms, Custom fonts in all formats including FAIS/ IntelliFont (with original fees), PCL5, postscript and TrueType. HP LaserJet Font cartridges (with any combination of scalable bitmaps, macros, and forms)

AutoFont USA
Tel: 800-588-7548
Tel: 615-588-9445 Fax 615-588-9472
P.O. Box 52248 Knoxville, TN 37950-2248
Satisfaction Guaranteed or your money back!

CIRCLE 526 ON READER SERVICE CARD

Insi

COMPETITIVE UPGRADE!

If you own a mouse or track-ball, you can purchase a

PC STYLUS™

Serial or PS/2

for only **$29.95**

Plus $4.50 S&H

Includes FREE:
- Cursor Plus® software
- Pen holder, pad & pouch

Call 800-833-8082

CIRCLE 527 ON READER SERVICE CARD

DUST COVERS

PROTECT your SYSTEM

100% Cotton Canvas is BEST

Against static,heat buildup,dust,pet hairs

Reduce Repairs & Downtime

All Models - All Styles - Guaranteed Satisfaction

Sample Pricing			
Laserjet IIP	22.95	Keyboards	13.95
Laserjet III	22.95	14" Monitor	20.00
Dot Matrix	18.00	25.5" Tower	24.95
Scanner	18.00	Typewriters	20.00

Large wipey-lynx breathable stylish longlasting cleanable

ViziFlex Keyboard "skins"
only $24.95, over 900 styles

CALL TODAY
(800)826-5761
Int'l (415)587 3002 FAX (415)587 3009

Contemporary ComputerWear
VISA/MC POD Dealer Inq Professional Pricing Available

SECURITY with a CUSTOM FIT

CIRCLE 528 ON READER SERVICE CARD

FREE

204 PAGE GUIDE TO THE NEWEST & MOST COMPETITIVELY PRICED COMPUTER PRODUCTS

- Media & Supplies • Accessories
- Networking • Data Communication
- Power • Hardware & Software
- Computer Furniture

C A L L
1-800-8 GLOBAL
or FAX 1-516-625-6683

GLOBAL®
COMPUTER SUPPLIES
N Y • C A • G A • I L

CIRCLE 529 ON READER SERVICE CARD

TONER

PRICES STARTING AT $40

Your Cartridge Remanufactured
UPS RETURN INCLUDED

MORE TONER • COLORS
RICHER BLACKS
FULLY TESTED

We now service XEROX 1012, 5012 & 5014 copy cartridges.
Now Even More with our new 40,000 page "Duro-Drum"

1•800•442•6288
DISCOVER/MC/VISA
Southern Cartridge Service, Inc.
33 Mathews Drive
Hilton Head Island, SC 29926

CIRCLE 530 ON READER SERVICE CARD

PC/Computing subscribers triple accessory spending.

In the next 6 months, PC/Computing subscribers intend to triple accessory spending for their organizations to an average of $9,641—up from $3,311.

Get your share!

Advertise in PC/Computing Marketplace.

Call today for information at 800 825-4237.

Source: 1st Half 1992 Buying Trends Market Study
Base: employed subscribers

66% of PC/Computing subscribers buy directly from the ad in front of them. Put your ad in front of them, here.

Get your share. Call PC/Computing Marketplace at

800-825-4237

Source: 1992 Buying Trends Market Study Wave III

HARD CASE PROTECTION
Your notebook won't feel a thing!

NB-4000 $179.95
Holds computer, accessories, files and disks (pictured)

NB-3000 $149.95
Holds computer & accessories

NB-1000 Holds computer only w/shoulder strap $59.95
$69.95

- Hard double-shell construction
- Highest quality foam interior
- Lockable • Made in USA

1-800-475-0707
719-531-5535

See Your Computer Dealer or Contact:
DOUBLECASE™
5360 N. Academy Blvd
Colorado Springs, CO 80918

CIRCLE 532 ON READER SERVICE CARD

BEST REE!
Computer Accessories
812 Fernon St., Philadelphia, PA 19148

ed the HOTTEST & SEXIEST Images
r ADULT On-Line Magazine - FREE!

e an Adult On-Line Magazine that
ou:

RIGINAL Adult GIF Images not
ilable on any other BBS!

RGEOUS, Sexy & Exotic Models
h Amateur and Professional !

ALITY Adult GIF Images and VGA
ries produced by professionals !

H SPEED access available on
lines (14.4k down to 1200 baud).

your Modem to 8-N-1 and dial:

18) 709 - 4275
ou! Call our voice line at (818) 709-3785

Underdesk Keyboard Drawer
Wide keyboard drawer stores all sizes of PC/AT keyboards. Save valuable workspace. Folding bracket mounts easily under any desktop or shelf. 15-1/4"(D) x 22-1/2"(W) x 1-1/2" (H) Part No. KD4UM
Retail Price: $35.95 Our Price: $17.95

TO ORDER CALL:
215-551-0210
Call for items not listed & Quantity pricing
Free shipping on Order's of $50 or More

CIRCLE 533 ON READER SERVICE CARD

FACE
n-line adult magazine
y 18 Years Of Age or Older ! Limited Offer

E 534 ON READER SERVICE CARD

Meet Meche
5 photos in 8-bit color GIF #3-84, $9.95
$9.95

Floppy Disk Sets 25 color pictures, image viewer free w/1st order. #888
3.5"

#3-10 Model Sampler - beautiful models... $29.95
#3-15 From Behind - photos $29.95
#3-13 Exotica - erotic art - by Olivia $29.95

CD-ROM - photo images in 24-bit color w/ picture viewer.
#3-40 Heavenly Bodies v1 - 200 photos $99.95
#2-401 Adult Palate - 190 photos $59.95
#3-415 Overexposed - 200 photos $99.95
Adult Entertainment
#3-424 Girls with Girls $99.95

BodyCello Must be 21 or older to order
1-800-922-3556
Dealer Inquiries Welcome
For 40-page uncensored color catalog send $2.00
P.O. Box 810031 Sorrento Valley, CA 92191
Catalog FREE with purchase
info: 619-279-0855 • Fax: 619-535-2597 • include $4.75 for s/h • Foreign add $15 s/h • CA res. add sales tax

CIRCLE 535 ON READER SERVICE CARD

FOR ADULTS ONLY
You must be over 21 to access
LIFESTYLE
Meet sexy singles/couples on the world's hottest adult chat system – Lifestyle BBS.
Less than 30¢ per hour.
Log on: 516-689-5390
AND
GRAFIX
Computer pictures so hot they could melt your modem.
Log on: 516-689-2853
SUPER CHEAP • 100% PRIVATE
Local access from 500+ cities

CIRCLE 536 ON READER SERVICE CARD

here Adults
me To Play!
he World's Choice For
T MODEM FUN!
HAT Live W/Thousands of
& Gents in Groups & Private!
of Sizzing Hot Message Areas.
are Files and Adult GIFs!
aker With "DATING-BASE"!
and Gay Sections!
mpetitive Tournament Gaming!
d Connect With One Low Price!
umbers In Over 600 Cities!
ch Much More!
h Our Exclusive
ASY Area!
ODYSSEY
BBS
For Modem Signup or More Info Call
318-358-6968

CIS7 ON READER SERVICE CARD

84% of PC/Computing subscribers advised friends and business colleagues on purchasing PC products in the past six months.

Are they recommending you?

Profit with the influentials.
Call your PC/Computing Marketplace account representative today at 800 825-4237.

Source: 1992 Buying Trends Market Study Wave III

Penn Jillette

At Last, Here's the Math Behind Encryption

You don't need no stinkin' Clipper Chip. Do the math yourself.

LAST MONTH I ranted against the Clipper Chip. I wanted to carry on more now, but between my writing and your reading, the *Village Voice* did a cover on Cypherpunks, so I'm late. (Uma Thurman has never been on their cover so, in my little ant brain, she's still computer news.)

Everyone from the *New York Times* to the *Village Voice* (37 blocks geographically and fewer politically) thinks that computer privacy is guaranteed somewhere between the lines of the Fourth and Fifth amendments, but if technology can give it to us de facto, cool. We can't let our shifty government have a back door no matter how much they give us scout's honor that it'll only be used against drug dealers and child pornographers.

Although the noncomputer press has covered the politics of the issue, no one has touched the math. All you'll learn from the *Voice* is "Cypherpunks write code" (the Cypherpunks motto). It's up to me: I'm going to explain the basic math of public key encryption (thanks to my Bell Labs buddies, who explained it to me).

First, here's how it works: You publish two big personal numbers for everyone who might want to write stuff to you that they might not want read by the *National Enquirer*, Slick Willy, or your office mates. The numbers are no secret—that's the "public" part of public key encryption.

Once someone codes a message using your big old public numbers, no one, not even the very person who wrote the message, can decode it without your top-secret-big-PRIVATE number. Only you (and the National Security Agency if they work around the clock for months on nothing but your stupid little message) can decode it. The great thing about public key encryption is that you can still have privacy over something as public as faithful assistant Algore's "information highway" without having to exchange keys. The thinking is, if you have a secure channel to send the keys, why the hell wouldn't you just send your message there?

Here's the math. Start with a number N, where N is PQ, and P and Q are both prime. That means N is divisible only by P, Q, itself, and 1 (and division by 1 is just stupid). When I was checking the arithmetic, I used 3 and 5, but you'll want bigger primes—they got big lists of 'em.

Any message can become a number (my computer thinks all my columns are just numbers, and someday, maybe we'll print one in just 1s and 0s). Let's say Uma wants to rendezvous with me (let's not just say it, let's pray for it), and her secret message tells me where and when. Her little love message becomes a number, and we'll call that number x.

Choose a and b such that $ab = 1 \bmod (P-1)(Q-1)$, and you can bet your ass that $x_{ab} = x \bmod N$ (I like math—I can use parentheses all I want). *Mod* stands for *modulo* (or the early Who), which means you ignore everything but the remainder. This is all from Fermat's little theorem (FLT), which is bigger than his grandstanding last theorem. "Ignoring all but the remainder" is the "2 a.m. dating bar theorem" (PLT).

I give Uma N and a (oh yeah), keep b secret, and forget my P and Q. Uma computes $x_a \bmod N$ (in her pretty little head). This will look like random noise, so when she sends it to me no wiretapper can understand it. I receive that number and compute $(x_a \bmod N)_b \bmod N$, which equals $x_{ab} \bmod N$ (exercise for the reader), which equals $x \bmod N$ from FLT, and that's x—the original message—if $x < N$, which it is, wlog. QED.

I'd reverse the process and encode my response to her, but it's already public. ◪

Penn & Teller will be regular guests on the new David Letterman show.

ILLUSTRATION BY CARY BARBOUR/CONTA

FINALLY, PCs AS DEDICATED TO YOUR BUSINESS AS YOU ARE.

DELL
OPTIPLEX

ASTER, TAKE BREAKS, PLAN AHEAD.

EASIER TO MAINTAIN, SO YOU GET BACK TO WORK FASTER.

Nothing's more important in business than the ability quickly bounce back from adversity. So we've made ur OptiPlex PCs extraordinarily easy to service. ur unique OptiFrame chassis can essentially e snapped apart after turning a couple of umbscrews. Most of the important mponent assemblies can then be removed mply by loosening one screw per assembly. And e card cage lifts out in one piece for easy access to e system board. No cards to remove or cables to sconnect.

In fact, you'll find our whole company is easy use. Dell offers a unique service plan — our lectCare™ program. You can pick and choose m a comprehensive menu of service options that includes erything from an optional five-year parts and labor arranty to a highly economical plan for those who would efer to maintain their PCs themselves. The bottom line , you pay only for services you want or ed. And not a cent for those you don't.

It's this kind of service and support that s made Dell the winner of virtually every ajor customer satisfaction survey in the st five years. It's also earned us a place in er two-thirds of the companies in the RTUNE 500.*

And having picked up over $2 billion in rldwide sales, we think we'll keep it up for a rtle while longer.

If you want them to work even harder, no problem. All systems are upgradeable to Pentium Overdrive.

With our embedded diagnostics you don't have to push hard to get at the root of a problem.

READY TO GROW AS YOUR BUSINESS GROWS.

There's one more thing we built into these PCs that is indispensable to any successful business. Foresight.

With an OptiPlex L system you can easily upgrade from three to five slots, and from three to five drive bays. The chassis upgrade usually takes but a few painless minutes.

OptiPlex systems also feature an easy BIOS upgrade — by way of flash RAM so there are no chips to remove. With the system's embedded diagnostics located in the BIOS as well, that too is an easy upgrade. What's more, you can add up to 128KB of cache for memory-intensive applications. All systems can also be upgraded to Intel's mighty Pentium Overdrive processor.

We suggest you call us soon. With hard-working business machines like these out there, if you don't bring them on board, you can be sure your competitors will.

GUARANTEED

We offer guaranteed five-minute response to calls, 24 hours a day. *See, someone does work longer hours than you.*

DELL™

TO ORDER, CALL

800-433-6675

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA* CALL 800-668-3021. IN MEXICO CITY:* 228-7811. #11XBT

*ter 7/1/92. For a complete copy, please call our TechFax™ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees. *Benchmarking ng BAPCo SYSmark92 on comparable ISA systems configured substantially identical to the Dell OptiPlex, each with equaloem or maximum allowable external cache. NSTL is not affiliated with Dell and makes no d parameters. Results from other tests may vary. The Intel Inside logo is a registered trademark of Intel Corporation. FORTUNE 500 is a registered trademark of The Time Inc. Magazine Company. Dell disclaims*

THEY WORK F
SHORTER
AND ACTUALLY

INTRODUCING DELL OPTIPLEX. PCs DESIGNED FOR BUSINESS-CRITICAL APPLICATIONS.

(For systems and configurations, see back cover.)

DESIGNED AND CONFIGURED TO WORK HARDER AND FASTER.

This is much more than just another new line of PCs. These are role models for everyone in your office.

Dell's new OptiPlex PCs are serious, hard-working, hard-core business machines, designed to perform in the workplace.

Good-looking, hard-working, dedicated, flexible. See back page for resume and financial requirements.

Our accelerated local bus video kicks all your standard workday applications into high gear. Our systems are up to 16% faster than our major competitors' PCs.* As anyone who's ever worked on a spreadsheet will tell you, that adds up fast.

Every OptiPlex system also features advanced Dell optimized Windows display drivers. We also give you the ever popular burst mode memory transfer and block mode IDE transfer. (Translation: things go faster.)

We give you up to 16% faster overall application performance than our leading competitors!

And to spare you the usual set-up hassles, we'll have your PCs ready to run, right out of the box. You can have your choice of six network interface cards factory-installed. We'll also be more than happy to install your choice from over 100 of the most popular business software applications. All you pay is a flat $15 installation fee.

intel inside

**Guarantees available in USA only for registered owners of Dell Performance Series systems purchased o performed by National Software Testing Labs on 8/1/93. Independent performance measurement by NSTL runs recommendation or endorsement of any products. BAPCo-prepared tests executed by NSTL in accordance with L proprietary interest in the marks and names of others.* *©1993 Dell Computer Corporation. All rights reserved.*

SYSTEMS DESIGNED TO MAKE YOUR BUSINESS WORK HARDER. NOT YOUR BUDGET.

INTRODUCING DELL OPTIPLEX. PCs DESIGNED FOR BUSINESS-CRITICAL APPLICATIONS.

FEATURES COMMON TO ALL OPTIPLEX SYSTEMS

- i486™ PROCESSOR UPGRADEABLE TO PENTIUM™ OVERDRIVE™
- UNIQUE OPTIFRAME™ CHASSIS - EASY SERVICE AND MAINTENANCE
- UPGRADEABLE OPTIFRAME L CHASSIS HAS 3 16-BIT ISA SLOTS AND 3 STORAGE BAYS (EASILY FIELD UPGRADEABLE TO THE OPTIFRAME MX CHASSIS)
- MIDSIZE OPTIFRAME MX CHASSIS HAS 5 16-BIT ISA SLOTS AND 5 STORAGE BAYS
- ACCELERATED LOCAL BUS VIDEO WITH DELL OPTIMIZED WINDOWS DRIVERS
- 512KB VIDEO RAM EXPANDABLE TO 1MB
- OPTIONAL VESA® LOCAL BUS SLOT(S)
- OPTIONAL 128KB CACHE
- 4MB RAM EXPANDABLE TO 64MB
- BURST MODE MEMORY TRANSFER
- BLOCK MODE IDE DISK TRANSFER
- FLASH RAM BIOS
- EMBEDDED DIAGNOSTICS
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- QUIETKEY™ 101 KEYBOARD
- MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE
- GUARANTEED* NEXT-BUSINESS-DAY ON-SITE SERVICE*
- GUARANTEED* 5-MIN. RESPONSE TIME SUPPORT – 24 HOURS/DAY

DELL® OPTIPLEX™ 425s/L

$1,499 | BUSINESS LEASE* $55/MO.

- i486 SX 25MHz
- OPTIFRAME L CHASSIS
- 120MB IDE HARD DRIVE
- SVGA 1024I MONITOR (14", 1024 x 768, .28mm)

DELL OPTIPLEX 433s/L

$1,799 | BUSINESS LEASE $67/MO.

- i486 SX 33MHz
- OPTIFRAME L CHASSIS
- 170MB IDE HARD DRIVE
- ULTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/L

$1,999 | BUSINESS LEASE $74/MO.

- i486 DX 33MHz
- OPTIFRAME L CHASSIS
- 170MB IDE HARD DRIVE
- ULTRASCAN 14C MONITOR (14", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/L

$2,249 | BUSINESS LEASE $83/MO.

- i486 DX 33MHz
- OPTIFRAME L CHASSIS
- 230MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 450/L

$2,449 | BUSINESS LEASE $91/MO.

- i486 DX2 50MHz
- OPTIFRAME L CHASSIS
- 230MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 466/L

$2,999 | BUSINESS LEASE $111/MO.

- i486 DX2 66MHz
- OPTIFRAME L CHASSIS
- UPGRADED TO 8MB RAM
- 340MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 433/MX

$2,749 | BUSINESS LEASE $102/MO.

- i486 DX 33MHz
- OPTIFRAME MX CHASSIS
- UPGRADED TO 8MB RAM
- 340MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

DELL OPTIPLEX 466/MX

$3,249 | BUSINESS LEASE $120/MO.

- i486 DX2 66MHz
- OPTIFRAME MX CHASSIS
- UPGRADED TO 8MB RAM
- 450MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)

intel inside

ALSO AVAILABLE: **DELL 466/ME**

$3,649 | BUSINESS LEASE $131/MO.

(NOT PICTURED ABOVE)

- i486 DX2 66MHz
- 4 EISA AND 2 ISA EXPANSION SLOTS AVAILABLE
- 5 STORAGE BAYS
- BURST MODE MEMORY TRANSFER
- BLOCK MODE IDE TRANSFER
- FLASH RAM BIOS
- 8MB RAM EXPANDABLE TO 64MB
- 450MB IDE HARD DRIVE
- 1MB VIDEO RAM
- ACCELERATED LOCAL BUS VIDEO WITH DELL OPTIMIZED WINDOWS DRIVERS
- ULTRASCAN 15FS MONITOR (15", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5" OR 5.25")
- QUIETKEY 101 KEYBOARD
- MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE
- EMBEDDED DIAGNOSTICS
- GUARANTEED NEXT-BUSINESS-DAY ON-SITE SERVICE
- GUARANTEED 5-MINUTE RESPONSE TIME SUPPORT - 24 HOURS/DAY

Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax™ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX 78759-7299. Attention Guarantees.
*Prices valid in the U.S. only. Some products and promotions not available in Canada or Mexico. †Leasing arranged by Leasing Group, Inc. For business use only. Prices based on 36-month, open-end lease, 10% purchase option. *On-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote locations. MS-DOS and Microsoft are registered trademarks and Windows is a trademark of Microsoft Corporation. The Intel Inside logo is a registered trademark and i486, Pentium and Overdrive are trademarks of Intel Corporation. VESA is a registered trademark of Video Electronics Standards Association. Dell disclaims proprietary interest in the marks and names of others.* ©1993 Dell Computer Corporation. All rights reserved.

DELL™

TO ORDER, CALL
800-626-4382

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT
IN CANADA* CALL 800-668-3021 IN MEXICO CITY* 228-7811 #11XB5